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TP 10575F

REMPLACEMENT D'UN PSEUDO-PILOTE PAR DES TECHNOLOGIES DE RECONNAISSANCE ET DE GÉNÉRATION DE LA PAROLE

VOLUME II

pour le
Centre de développement des transports
Groupe des politiques et de la coordination
Transports Canada

Juillet 1990

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Remplacement d'un pseudo-pilote par des technologies de reconnaissance et de génération de la parole

Volume II

par

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École Polytechnique de Montréal et
Centre canadien de recherche sur
l'informatisation du travail

Juillet 1990

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Volume I : Rapport

16. Résumé

But : ce rapport vise à déterminer comment on peut remplacer un pseudo-pilote humain par un dispositif utilisant des techniques de reconnaissance et de génération de la parole.

Méthode : on examine d'abord l'état actuel de la recherche appliquée en Amérique du Nord et en Europe. On élabore ensuite un modèle sur mesure du langage des élèves contrôleurs. On examine alors l'utilisation des technologies de reconnaissance et de génération de la parole.

Résultats : on constate qu'il y a un certain nombre de systèmes en cours de développement, même si aucun n'est encore en exploitation. On propose la représentation par schémas comme modèle de langage pour un pseudo-pilote automatisé. On formule des recommandations sur l'exploitation des technologies de reconnaissance et de génération de la parole.

Conclusion : il semble techniquement faisable de réaliser un pseudo-pilote automatisé. On doit cependant choisir si on veut un système passif (i.e. un simulateur commandé par la voix) ou un système actif (i.e. qui conseillera l'élève contrôleur). On doit aussi choisir si on veut un système réalisé entièrement au Canada ou si on désire établir une coopération avec un organisme qui développe actuellement des pseudo-pilotes automatisés.

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Volume I : Report

16. Abstract

Objective : The objective of this report is to determine how to replace a human pseudo-pilot with a device using speech recognition and generation technology.

Method : First, the state of the applied research in North America and Europe is surveyed. Then, a custom language model for air traffic control is developed. Finally, the use of speech recognition and generation technology for this application is reviewed.

Results : Although several systems are in the development stage, none is in current use. The use of a frame-based language model is recommended in this application. Recommendations are made regarding the use of speech recognition and generation technology.

Conclusion : The development of a voice driven pseudo-pilot seems technically feasible. However, a choice must be made between a passive system (e.g. voice-driven simulator) and an active system (e.g. one that will coach the trainee). A choice must also be made between an entirely Canadian system and a system developed in cooperation with a partner already active in this field.

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ANNEXES

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Annexe B: Transcriptions d'exercices simples

Annexe C: Vocabulaire des élèves contrôleurs pour les exercices simples

Annexe D: Élaboration des schémas individuels pour les exercices simples

Annexe E: Résumé des schémas et des sous-schémas pour les exercices simples

Annexe F: Attribution des cotes

Annexe G: Analyse des processus de gestion des erreurs

Annexe H: Transcriptions d'exercices complexes

Annexe I: Vocabulaire des élèves contrôleurs pour les exercices complexes

Annexe J: Ébauche de schémas additionnels pour les exercices complexes

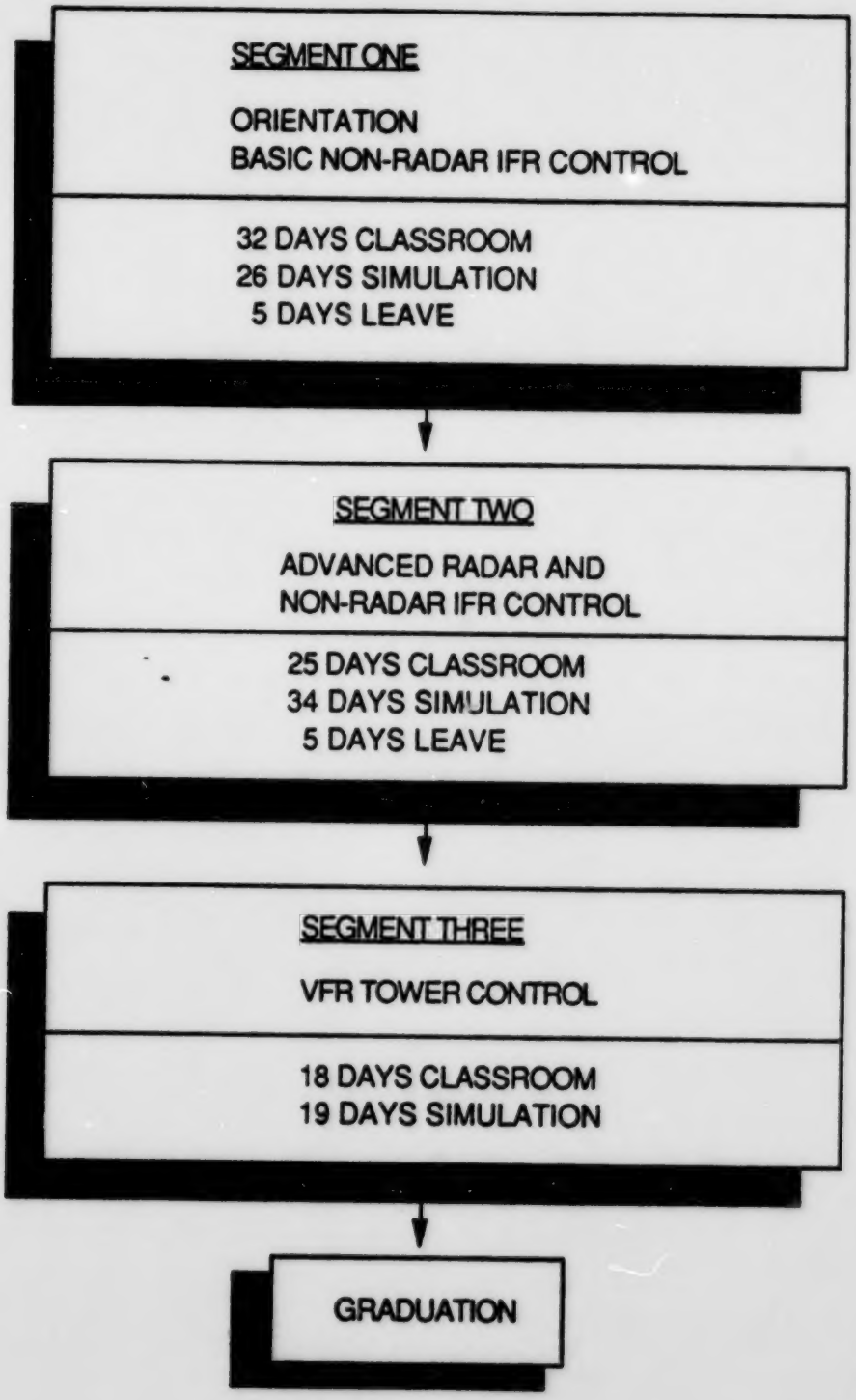
Annexe K: Analyse de transmissions concaténées

Annexe L: Vocabulaire des pseudo-pilotes

Annexe A: Extrait du plan de cours de l'Institut de Formation de Transports Canada, Cornwall, Ont.

STUDY NOTE ORIENTATION

BASIC ATC MAINSTREAM COURSE



STUDY NOTE ORIENTATION

SEGMENT TWO - ADVANCED RADAR AND NON-RADAR IFR CONTROL OVERVIEW

TO6 NON-RADAR IFR CONTROL

ASSESSMENT TEST #1

TO1 RADAR CONTROL - VECTORING
SIMULATION EXERCISES

TO7 METEOROLOGY
PRACTICE WEATHER OBSERVATIONS

MET ASSESSMENT TEST 1

ASSESSMENT TEST #2

TO2 RADAR CONTROL - HIGH LEVEL
SIMULATION EXERCISES

TO3 RADAR CONTROL - LOW LEVEL
SIMULATION EXERCISES

TO4 RADAR CONTROL - TERMINAL
SIMULATION EXERCISES

MET ASSESSMENT TEST 2

TO5 RADAR CONTROL - COMBINED OPERATION
SIMULATION EXERCISES

ASSESSMENT TEST #3

MET ASSESSMENT TEST 3

SKILL TEST - COMBINED OPERATION

Annexe B: Transcriptions d'exercices simples

Transcription: IFR novice, ID= 1A

Notes:

- **Un message émis par l'élève-contrôleur est précédé par C=.**
- **Un message émis par le pseudo-pilote est précédé par P=.**
- **Un message émis par un autre centre est précédé par Other-center ou par le nom du centre.**
- **Un ***** signale un fragment de phrase qui n'a pas pu être identifié.**
- **Un iiiii signale un mot qui a été prononcé de façon incomplète.**

C= November nine hundred Papa Bravo say your heading

P= November nine zero zero Papa Bravo steady three five five

C= November nine nine zero zero Papa Bravo vectors for spacing turn right heading zero three five

P= confirm right zero three five for November zero zero Papa Bravo

C= confirm zero three five

P= roger

C= November nine zero zero Papa Bravo maintain one two thousand Stilpond altimeter two niner niner two report leaving flight level two four zero

P= November nine zero zero Papa Bravo leaving flight level two five zero now for one two thousand call you at a flight level two four zero roger

P= Midtown November nine zero zero Papa Bravo at a flight level two four zero

C= November nine hundred Papa Bravo center roger break Air Canada nine five one maintain one two thousand Stilpond altimeter two niner niner two

P= Canada nine five one leaving flight level two four zero now for flight iiiii leaving two four zero for one two thousand roger check altimeter two niner niner two

C= November nine hundred Papa Bravo fifteen miles east of Juliet five six five vectors to re-intercept turn left heading three one five

P= left three one five to intercept the Stilpond one seven six November nine zero zero Papa Bravo roger

C= November nine zero zero Papa Bravo maintain normal navigation

P= November nine zero zero Papa Bravo roger

Other-center= Avalanche Eastview hand-off *****

C= say again

Other-center= Avalanche Eastview hand-off *****

C= go ahead

Other-center= one five miles south of ***** on Juliet five six seven Lufthansa four seven one flight level two eight zero colocated with Air France zero three one flight level two six oh

C= ***** four seven one radar identified Air France zero three one radar identified ***** Foxtrot

P= Town center Lufthansa four seven one your frequency flight level two eight zero

C= ***** four seventy-one center roger

P= Town center Air France zero three one with you flight level two six zero

C= Air France zero three one center roger

C= Eastview Mooselake *****

Eastview= go ahead

C= I-11 be vectoring Lufthansa four seventy-one ten miles *instructor-intervention:within-ten-miles* within ten miles of the boundary east of Avalanche descending to one two thousand

Eastview= **********

C= ***** Foxtrot

C= Lufthansa four seven one say your heading

C= Lufthansa four seven one say your heading

**********communication-problem**********

C= iiiii Lufthansa four seventy-one say your heading

P= Lufthansa four seven one steady three five five

C= iiiii Lufthansa four seven one vectors for spacing turn right heading zero three five report

P= confirm right to zero three five for Lufthansa four seven one

C= terminal Mooselake handoff south

other center= go ahead

other center= terminal go ahead

C= on the boundary instructor-intervention:on-the-one-seven-six-radial* on the one seven six radial Air Canada nine five one *instructor-intervention:thats-it* ten miles from boundary *instructor-intervention:ten miles in trail* ten miles in trail November nine hundred Papa Bravo

other center= Air Canada nine five one identifed November nine zero zero Papa Bravo identified *****

C= ***** foxtrot

C= Air Canada nine five one contact Stilpond terminal one twenty five fifteen

P= two five one five Air Canada nine five one roger

C= November nine zero zero Papa Bravo contact Stilpond terminal on one two five decimal one five

P= two five one five November nine zero zero Papa Bravo good day

C= ***** Lufthansa ***** turn *****

P= I asked ***** to confirm the turn *****

C= zero three five

P= roger

P= end of turn

C= Lufthansa four seven one maintain one two thousand Stilpond altimeter two niner niner two report leaving flight level two six zero

P= Lufthansa four seven one leaving flight level two eight zero for one two thousand will call you at a flight level two six zero roger

P= Midtown Lufthansa four seven one passing through flight level two six zero

C= Lufthansa four seventy one center roger break Air France zero three one maintain one two thousand Stilpond altimeter two niner niner two

P= France zero three one leaving flight level two six zero for one two thousand altimeter two niner niner two roger

C= Duluth four iiiii Lufthansa four seven one fifteen miles east of Juliet five six seven to reintercept on course turn left heading three one five resume normal navigation

P= left turn three one five to intercept Stilpond one seven six radial Lufthansa four seven one roger

other-center= Avalanche Eastview handoff ***

C= maintain go ahead

other-center= at ***** i-ve got three for you first Canadian six three flight level two six zero colocated with Air Canada eight five seven flight level two eight zero and Alitalia six six five flight level three one zero

C= Canadian sixty three Air Canada eight five seven Alitalia six sixty five identified and requesting control for vectors east

other-center= all three your control vectors approved

C= that east and *****

other-center= that-s *****

C= ***** Foxtrot

C= Alitalia six sixty five say your heading

P= iiiii Alitalia six six five steady three five five

C= Alitalia six sixty five vectors for spacing turn right heading zero five five

P= right zero five five Alitalia six five five

P= Midtown Air Canada eight five seven your frequency flight level two eight zero

C= Air Canada eight fifty seven Mooselake iiiii Air euh midtown center roger

P= Town Canadian six three with you flight level two six zero

C= Canadian sixty three midtown center roger

P= Midtown Air France zero three one level one two thousand

C= Air France zero iiiii thirty one check your level one two thousand

P= Town Lufthansa four seven one level one two thousand

C= ***** can you say again

P= town Lufthansa four seven one level one two thousand

C= Lufthansa four seven one center roger

C= Canadian six three vectors for spacing turn right heading three five

P= Canadian six three in the right turn zero three five roger

C= Canadian six three disregard euh maintain heading three five five Air Canada eight five seven vectors for spacing turn right heading zero three five

P= right zero three five Air Canada eight five seven roger

C= terminal Mooselake handoff south

other-center= terminal go ahead

C= on the iiiii on the boundary euh iiiii one seven six radial Air France zero three one in trail Duluth four seventy one

other-center= Air France zero three one identified confirm the name second one

C= *instructor-intervention:Duluth*

other-center= Lufthansa four seven one identified *****

C= ***** Foxtrot

C= Air iiiii Air France zero three one contact Stilpond terminal one two five decimal one five

P= two five one five Air France zero three one roger

C= Duluth four seventy-one contact Stilpond terminal Lufthansa four seventy-one contact Stilpond terminal one two five decimal one five

P= Lufthansa four seven one one two five one five

C= Alitalia six sixty five turn left heading zero three five

C= and Alitalia six six six five maintain one two thousand report leaving report leaving flight level two eight zero

P= Alitalia six six five left turn zero three five and descent to euh leaving flight level two eight zero now for one two thousand call you at a flight level euh two eight zero

C= euh Stilpond altimeter two niner niner two

P= and check we-re at a flight level three one zero for one two thousand call you through two eight zero

P= check altimeter two niner niner two

P= Town Alitalia six six five at a flight level two eight zero

C= Alitalia six six five center roger break Air Canada eight five seven maintain one two thousand Stilpond altimeter two niner niner two report leaving flight level two six zero

P= Air Canada eight five seven leaving flight level two eight zero now for one two thousand altimeter two niner niner two call you at a flight level two six zero roger

C= Air Canada eight five seven fifteen miles east of Juliet five six seven vectors to iiiii re-intercept airway turn left heading three one five

P= Air Canada eight five seven in left turn to intercept Juliet five six seven roger

C= Air Canada eight five seven resume normal navigation

P= Canada eight five seven roger

C= Alitalia six sixty five twenty five miles east of Juliet five six seven vectors to re-intercept airway turn left heading three one five resume normal navigation

P= Alitalia six six five left three one five turn to intercept Juliet five six seven roger

P= Town Air Canada five six seven passing through flight level two six zero

C= Air Canada eight fifty seven center roger break Canadian sixty three maintain one two thousand Stilpond altimeter two niner niner two

P= Canadian six three leaving flight level two six zero for one two thousand altimeter two niner niner two roger

C= Terminal Mooselake handoff south

other-center= terminal go ahead

C= ten miles from the boundary on one seven six radial Canadian six three ten miles in trail Air Canada eight five seven and ten miles in trail behind Air Canada eight five seven Alitalia six sixty five

Transcriptions: exercice IFR novice, ID=2A

Notes:

- **Un message émis par l'élève-contrôleur est précédé par C=.**
- **Un message émis par le pseudo-pilote est précédé par P=.**
- **Un message émis par un autre centre est prédédé par Other-center ou par le nom du centre.**
- **Un ***** signale un fragment de phrase qui n'a pas pu être identifié.**
- **Un iiiii signale un mot qui a été prononcé de façon incomplète.**

C= November Papa Bravo maintain one two thousand Stilpond altimeter two niner niner two report leaving flight level two four zero

P= November nine zero zero Papa Bravo leaving flight level two five zero for one two thousand call you at flight level two four zero

P= Midtown November nine zero zero Papa Bravo through flight level two four zero

C= November nine zero zero Papa Bravo Roger break Air Canada nine five one maintain one two thousand Stilpond altimeter two niner niner two

P= Air Canada nine five one leaving flight level two four zero for one two thousand altimeter two niner niner two roger

C= Air Canada nine five one center roger

C= November Papa Bravo euh vectors to reintercept Juliet five six seven turn left heading three three one five to reintercept the airway resume normal navigation

P= left turn heading three one five to intercept the euh the airway on course November nine zero zero Papa Bravo roger

C= Eastview Mooselake i have a target at *****

Eastview= roger three miles north of ***** Juliet five six seven I-ve got Air France zero three one flight level two six zero Lufthansa four seven one flight level two eight zero

C= target identified Air France zero three one Lufthansia four seven one *****

C= euh Stilpond Mooselake handoff south

Stilpond= Stilpond go ahead

C= euh five miles from the boundary euh Juliet and euh one seven six radial Air Canada nine five one euh descending *instructor-intervention:that-s-enough* euh ten miles in trail November nine zero zero Papa Bravo

Stilpond= Air Canada nine five one identifying negative target *****

P= town Center Lufthansa four seven one your frequency flight level two eight zero

C= Air Canada nine five one iiiii contact Stilpond terminal at one two five decimal one five now

P= two five one five Air Canada nine five one roger

C= Lufthansa midtown center Lufthansia four seven one midtown center roger

P= midtown Air France zero three one your frequency flight level two six zero

C= Air France zero three one center roger

C= ***** Eastview midtown *****

Eastview = go ahead

C= I'll be vectoring Lufthansia four seven one within ten miles from the boundary to descending to one two thousand

Unidentified= that-s ***** watch

C= Lufthansa four seven one say your heading

P= Lufthansa four seven one steady three five five

C= Lufthansia four seven one turn right heading zero three five

P= right turn zero three five Lufthansa for seven one

C= Stilpond Mooselake handoff five miles south of the border

Stilpond= Stilpond go ahead

C= euh November nine zero zero Papa Bravo five miles from Stilpond eeeh one seven six radial Papa Alpha

Stilpond= november nine zero zero Papa Bravo identified *****

C= November Papa Bravo contact euh Stilpond terminal one two five decimal one five now

P= one two five one five November nine zero zero Papa Bravo

C= Lufthansia four seven one euh descend to one two thousand maintain one two thousand euh Stilpond altimeter two niner niner two report iiiii leaving flight level two six zero

P= Lufthansa four seven one leaving flight level two eight zero for one two thousand will call you at a flight level two six zero check altimeter two niner niner two

C= Lufthansia four seven one fifteen miles east of Juliet five six seven vectors to reintercept the airway turn left heading three five five three one five euh resume normal navigation

P= Lufthansa four seven one left three one five to intercept Juliet five six seven and check we are just passing through flight level two six oh now

C= Lufthansia four seven one center roger break Air France zero three one maintain one two thousand Stilpond altimeter two niner niner two

P= France zero three one leaving flight level two six zero now for one two thousand altimeter two niner niner two roger

C= Air France zero three one center roger

C= iiiii Eastview Mooselake target at ***** Eastview I have target at *****

Other center= roger at ***** I've got three for you first on the Air Canada eight five seven flight level two eight zero colocated with Alitalia six six five flight level three one zero and Canadian six three flight level two six oh

C= Eastview target identified

C= Canadian six three Air Canada eight five seven iiiii Alitalia six six five all identified

Eastview= roger

P= Midtown center Canadian six three your frequency flight level two six zero

C= Canadian six three center standby

C= Eastview midtown *****
Other center= Eastview go ahead

C= ***** handed off ***** flight control for vectors to descend

Other center= had a squelch problem

C= Canadian six three midtown center say your altitude

P= Midtown Canadian six three level flight level two six zero your frequency

C= Canadian six three center roger

P= Town center Canada eight five seven flight level two eight zero your frequency

C= Air Canada eight five iiiii seven center roger

P= Midtown Alitalia six six five with you flight level three one zero

C= Alitalia six six five midtown center roger

C= Alitalia six six five say your heading

P= Alitalia six six five we-re steady heading three five five

C= Alitalia vectors for spacing turn right on a heading of zero five five

P= right turn zero five five Alitalia six six five roger

C= Stilpond Mooselake handoff south

Stilpond center= go ahead

C= euhh five miles *instructor-intervention:inside* inside the boundary south bound *instructor-intervention:on-the-one-seven-six-radial* on the one seven six radial euh Air France zero three one ten miles in trail Lufthansa four seven one

Stilpond center= Air France zero three one identified Lufthansa four seven one identified

C= Air Canada eight five seven center

P= Town center Air Canada eight five seven go ahead

C= Air Canada eight five seven vectors for spacing turn right on a heading of three three five correction heading zero three five

P= Right zero three five Air Canada eight five seven roger

C= Air France zero three one contact Stilpond terminal one two five decimal one five

P= two five one five Air France zero three one good day

C= Lufthansia four seven one contact Stilpond terminal one two five decimal one five now

P= two five one five Lufthansa four seven one

C= Alitalia six six five euh turn left heading zero three five

P= left zero three five Alitalia six six five

C= Alitalia six six five maintain one two thousand report leaving flight level two eight zero euh Stilpond altimeter two niner niner two

P= Alitalia six six five leaving flight level three one zero now for flight euh for one two thousand call you through flight level two eight zero

C= Alitalia six six five roger

C= Air Canada eight five seven vectors to reintercept the airway euh fifteen miles east of Juliet five six seven turn left heading three five five to reintercept the airway resume normal navigation

P= Canada eight five seven left three five five i don-t think we'll intercept on that heading

C= Air Canada eight five seven correction turn left heading three one five

P= Canada eight five seven left on three one five to intercept roger

P= Midtown Alitalia six six five at the flight level two eight zero

C= Alitalia six six five roger break Air Canada eight five seven maintain one two thousand Stilpond altimeter two niner niner two report leaving flight level two six zero

P= Canada eight five seven leaving flight level two eight zero for for one two thousand altimeter two niner niner two will call you through flight level two six zero

C= midtown to ***** eight five seven roger

C= Alitalia six six five center twenty five miles east of Juliet five six seven turn left heading three one five to reintercept the airway resume normal navigation

P= left three one five to intercept Alitalia six six five

C= Canadian six three maintain one two thousand Stilpond altimeter two niner niner two

P= Canadian six three leaving flight level two six zero for one two thousand altimeter two niner niner two

P= Air Canada eight five seven sorry I missed the call I-m at flight level two six oh

C= Air Canada eight five seven center roger

C= Stilpond Mooselake handoff south

Stilpond= go ahead

C= five miles south of boundary euh euh one seven six radial Canadian six three Papa Alpha

Stilpond= Canadian six three identified *****

C= Canadian six three contact Stilpond terminal one two five decimal one five now

P= two five one five Canadian six three

Notes:

Lors de la transcription, on a pu observer que:

. L'élève-contrôleur ne converse qu'avec un ou deux individus différents (pseudo-pilotes), lesquels assument les rôles de différents pilotes.

. Le canal de radio capte les conversations des postes de travail adjacent lors des conversations entre l'élève-contrôleur et le pseudo-pilote. Le canal de radio capte aussi les interventions de l'instructeur.

. L'élève-contrôleur communique avec d'autres centres (d'autres contrôleurs, situés dans d'autres régions) en utilisant une "ligne directe", i.e. avec le même équipement de communication mais en utilisant un autre "canal". Il change de "canal" en appuyant sur un bouton situé sur la console.

Communications Canada
Centre canadien de recherche sur l'informatisation du travail (CCRIT)
Direction des Systèmes Intégrés

TP 10575F

REMPLACEMENT D'UN PSEUDO-PILOTE PAR DES TECHNOLOGIES DE RECONNAISSANCE ET DE GÉNÉRATION DE LA PAROLE

VOLUME II

pour le
Centre de développement des transports
Groupe des politiques et de la coordination
Transports Canada

Juillet 1990

Annexe C: Vocabulaire des élèves-contrôleurs pour les exercices simples

VOCABULAIRES COMBINES:
(Transcr. 1a et 2a)

A
AGAIN
AIRWAY
ALTIMETER
ALTITUDE
AND
AT
BREAK
CAN
CHECK
CONFIRM
CONTACT
CORRECTION
COURSE
DECIMAL
DESCEND
DISREGARD
EUH
FLIGHT
FOR
HEADING
IIIII
LEAVING
LEFT
LEVEL
MAINTAIN
MILES
NAVIGATION
NORMAL
NOW
OF
ON
REINTERCEPT
REPORT
RESUME
RIGHT
ROGER
SAY
SPACING
STANDBY
THE
TO
TURN
VECTORS
YOU
YOUR
*****
=========
Total (sans iiiii et *****) = 45

Annexe D: Elaboration des schémas individuels pour les exercices simples

ANALYSE DES MESSAGES ET ELABORATION DE SCHEMAS PRELIMINAIRES

SCHEMA: NDR
Messages emis par:Eleve-controleur

Trecr. no. de msg	Contenu du message								
1a	1 november	nine	hundred	papa	bravo	say	your	heading	
	31 lufthansa	four	seven	one		say	your	heading	
	32 lufthansa	four	seven	one		say	your	heading	
	33 lufthansa	four	seventy-one			say	your	heading	
	67 alitalia	six	sixty	five		say	your	heading	
2a	26 lufthansa	four	seven	one		say	your	heading	
	61 alitalia	six	six	five		say	your	heading	
	-------	-------	-------	-------	-------	-------	-------	-------	
		callsign				"say"	"your"	"heading"	

SCHEMA: NDA
Messages emis par:Pseudo-pilote.

Trecr. no. de msg	Contenu du message									
1a	2 november	nine	zero	zero	papa	bravo	steady	three	five	five
	34 lufthansa	four	seven	one			steady	three	five	five
	68 iiiii	alitalia	six	six	five		steady	three	five	five
2a	27 lufthansa	four	seven	one			steady	three	five	five
	62 alitalia	six	six	five			we-re	steady	heading	three
									five	five
	-------	-------	-------	-------	-------	-------	-------	-------	-------	-----
		callsign					"we-re"	"steady"	"heading"	cap

SCHEMA: NDD
Messages emis par:Eleve-controleur

Trecr. no. de msg	Contenu du message									
1a	96 alitalia	six	sixty-five		turn	left	heading	zero	three	five
2a	28 lufthansa	four	seven	one	turn	left	heading	zero	three	five
	77 alitalia	six	six	five	ouh	turn	left	heading	zero	three
										five
	(84) air	canada	eight	five	seven	correctioturn		left	heading	three
									one	five
	-------	-------	-------	-------	-------	-------	-------	-------	-------	-----
		callsign				"turn"	side	"heading"	heading	

SCHEMA: NDE
Messages emis par:Pseudo-pilote.

Trecr. no. de msg	Contenu du message									
1a	98 alitalia	six	six	five	left	turn	zero	three	five	
2a	29 right	turn	zero	three	five	lufthansa	four	seven	one	
	78 left	zero	three	five	alitalia	six	six	five		
	(85) canada	eight	five	seven	left	on	three	one	five	to
									intercept	roger
	-------	-------	-------	-------	-------	-------	-------	-------	-------	-----
		callsign			side	"on"	heading	"to"	"intercept"	

SCHEMA: VRD
Messages emis par:Eleve-controleur

Tracr.	no. de msg	Contenu du message									
1a	12	november	nine	hundred	papa	brave	fifteen	miles	east	of	juliet
		five	six	five	vectors	to	re-intercturn		left	heading	three
										one	five
	14	november	nine	zero	zero	maintain	normal	navigation			
	97	duluth	four	iiiii	lufthansafour		seven	one	fifteen	miles	east
		of	juliet	five	six	seven	to	reintercesn		course	turn
		left	heading	three	one	five	resume	normal	navigation		
	105	air	canada	eight	five	seven	fifteen	miles	east	of	juliet
		five	six	seven	vectors	to	iiiii	re-intercairway		turn	left
								heading	three	one	five
	107	air	canada	eight	five	seven	resume	normal	navigation		
	109	alitalia	six	sixty-fivtwenty		miles	east	of	juliet	five	six
		seven	vectors	to	re-intercturn		left	heading	three	one	five
								resume	normal	navigation	
2a	7	november	papa	brave	sub	vectors	to	re-interc	juliet	five	six
		seven	turn	left	heading	three	three	one	five to	reintercept	
						the	airway	resume	normal	navigation	
	38	lufthansa	four	seven	one	fifteen	miles	east	of	juliet	five
		six	seven	vectors	to	re-intercept		the	airway	turn	left
		heading	three	five	five	three	one	five	sub	resume	normal
											navigation
	93	air	canada	eight	five	seven	vectors	to	re-intercept		the
		airway	fifteen	miles	east	of	juliet	five	six	seven	turn
		left	heading	three	five	five	to	re-intercept		the	airway
		resume	normal	navigation							
	98	alitalia	six	six	five	twenty	five	miles	east	of	juliet
		five	six	seven	turn	left	heading	three	one	five	to
		reintercept	the	airway	resume	normal	navigation				
		callsign		position		'vectors''to'		're-intercept'		'the'	

SCHEMA: VRE
Messages emis par:Pseudo-pilote.

Tracr.	no. de msg	Contenu du message									
1a	13	left	three	one	five	to	interceptthe		stilpond	one	seven
		six	november	nine	zero	zero	papa	brave			
	58	left	turn	three	one	five	to	interceptstilpond		one	seven
		six	radial	lufthansafour		seven	one	roger			
	104	air	canada	eight	five	seven	in	left	turn	to	intercept
		juliet	five	six	seven	roger					
	110	alitalia	six	six	five	left	three	one	five	turn	to
		intercept	juliet	five	six	seven	roger				
2a	8	left	turn	heading	three	one	five	to	interceptthe		sub
		the	airway	on	course	november	nine	zero	zero	papa	brave
											roger
	39	Lufthansa	four	seven	one	left	three	one	five	to	intercept
		juliet	five	six	seven	...					
	(83)	...									
	91	left	three	one	five	to	interceptalitalia		six	six	five
		side	heading	'to'	'intercept'		airway	callsign			

SCHEMA: VRD
Messages emis par:Eleve-controleur

Tracr.	no. de msg	Contenu du message									
1a	3	november	nine	nine	zero	zero	papa	brave	vectors	for	spacing
		turn	right	heading	zero	three	five				
	35	iiii	lufthansafour		seven	one			vectors	for	spacing
		turn	right	heading	zero	three	five	report	aaaaa		
	69	alitalia	six	sixty-five					vectors	for	spacing
		turn	right	heading	zero	five	five				
	81	canadien	six	three					vectors	for	spacing
		turn	right	heading	three	five					
	83	air	canada	eight	five	seven	vectors	for	spacing	turn	right
		heading	zero	three	five						
									vectors	for	spacing
2a	63	alitalia									
		turn	right	on	a	heading	of	zero	five	five	
	71	air	canada	eight	five	seven			vectors	for	spacing
		turn	right	on	a	heading	of	three	five	five	correction
		heading	zero	three	five						
		callsign	'vectors''for'		'spacing''turn'		side	'on'	'a'	'heading''of'	
											heading

SCHEMA: VSE
Messages emis par:Pseudo-pilote.

Trscr.	no. de msg	Contenu du message									
1a	70	right	zero	five	five	alitalia	six	five	five		
	82	canadian	six	three	in	the	right	turn	zero	three	five
											roger
	84	right	zero	three	five	air	canada	eight	five	seven	roger
2a	64	right	turn	zero	five	five	alitalia	six	six	five	roger
	72	right	zero	three	five	air	canada	eight	five	seven	roger
		"in the"	side	"turn"		heading	callsign				"roger"

SCHEMA: ALDF
Messages emis par:Eleve-controleur

Trscr.	no. de msg	Contenu du message									
1a	7	november	nine	zero	zero	papa	bravo	maintain	one	two	thousand
		Stilpond	altimetertwo		niner	niner	two	report	leaving	flight	level
									two	four	zero
	52	lufthansa	four	seven	one			maintain	one	two	thousand
		stilpond	altimetertwo		niner	niner	two	report	leaving	flight	level
								two	six	zero	
(voir HDD)	97	and	alitalia	six	six	six	five	maintain	one	two	thousand
		report	leaving	report	leaving	flight	level	two	eight	zero	
	99	euh	stilpond	altimetertwo		niner	niner	two			
	103	air	canada	eight	five	seven		maintain	one	two	thousand
		stilpond	altimetertwo		niner	niner	two	report	leaving	flight	level
									two	six	zero
2a	1	november	papa	bravo				maintain	one	two	thousand
		stilpond	altimetertwo		niner	niner	two	report	leaving	flight	level
									two	four	zero
	36	lufthansa	four	seven	one	euh	descend	to	one	two	thousand
		maintain	one	two	thousand	euh	stilpond	altimetertwo		niner	niner
		two	report	iiiii	leaving	flight	level	two	six	zero	
	79	alitalia	six	six	five			maintain	one	two	thousand
		report	leaving	flight	level	two	eight	zero	euh	stilpond	altimeter
								two	niner	niner	two
	87	air	canada	eight	five	seven		maintain	one	two	thousand
		stilpond	altimetertwo		niner	niner	two	report	leaving	flight	level
									two	six	zero
		callsign	"descend"	"to"	"maintain"		altitude	alt. ref.	"altimeter"		
					altimeter reading			"report"	"leaving"	altitude	

SCHEMA: ALEF
Messages emis par:Pseudo-pilote.

Trscr.	no. de msg	Contenu du message									
1a	8	november	nine	zero	zero	papa	bravo	leaving	flight	level	two
		five	zero	now	for	one	two	thousand	call	you	at
		a	flight	level	two	four	zero	roger			
	53	lufthansa	four	seven	one			leaving	flight	level	two
		eight	zero	for	one	two	thousand	will	call	you	at
		a	flight	level	two	six	zero	roger			
(voir HDE)	98	alitalia	six	six	five	left	turn	zero	three	five	and
		descent	to	euh	leaving	flight	level	two	eight	zero	now
		for	one	two	thousand	call	you	at	a	flight	level
								euh	two	eight	zero
	100	and	check	wa-re	at	a	flight	level	three	one	zero
		for	one	two	thousand	call	you	through	two	eight	zero
	101	check	altimetertwo		niner	niner	two				
	104	air	canada	eight	five	seven		leaving	flight	level	two
		eight	zero	now	for	one	two	thousand	altimetertwo		niner
		niner	two	call	you	at	a	flight	level	two	six
					.					zero	roger
2a	2	november	nine	zero	papa	bravo		leaving	flight	level	two
		five	zero	for	one	two	thousand	call	you	at	flight
								level	two	four	zero
	37	lufthansa	four	seven	one			leaving	flight	level	two
		eight	zero	for	one	two	thousand	will	call	you	at
		a	flight	level	one	two	thousand	check	altimetertwo		niner
										niner	two
	80	alitalia	six	six	five			leaving	flight	level	three
		one	zero	now	for	flight	euh	for	one	two	thousand
		call	you	through	flight	level	two	eight	zero		
	88	canada	eight	five	seven	leaving	flight	level	two	eight	zero
		for	one	two	thousand	stilpond	altimetertwo		niner	niner	two
		will	call	you	through	flight	level	two	six	zero	
		callsign	"leaving"		altitude	"now"	"for"	altitude	"altimeter	altimeter	
						"will"	"call"	"you"	"through"	altitude	

SCHEMA: ALF
Messages emis par:Eleve-controleur

Trscr.	no. de msg	Contenu du message								
1a	9	midtown	november	nine	zero	zero	papa	brave	at	a	flight
								level	two	four	zero
	54	midtown	lufthansafour	seven	one	passing	through	flight	level	two	
									six	zero	
	102	town	alitalia	six	six	five	at	a	flight	level	two
									eight	zero	
	111	town	air	canada	five	six	seven	passing	through	flight	level
									two	six	zero
2a	3	midtown	november	nine	zero	zero	papa	brave	through	flight	level
									two	four	zero
	39	...	and	check	we-re	just	passing	through	flight	level	two
									six	oh	now
	86 (94)	midtown	alitalia	six	six	five	at	the	flight	level	two
										eight	zero
		center		callsign	"we-re"	"just"	"passing"	"through"	altitude		"now"

SCHEMA: ALB
Messages emis par:Eleve-controleur

Trscr.	no. de msg	Contenu du message							
2a	54	canadian	six	three	midtown	center	say	your	altitude
			callsign				"say"	"your"	"altitude"

SCHEMA: ALA
Messages emis par:Pseudo-pilote.

Trscr.	no. de msg	Contenu du message									
2a	55	midtown	canadian	six	three	level	flight	level	two	six	zero
										your	frequency
		center		callsign			altitude			"your"	"frequency"

SCHEMA: ALD
Messages emis par:Eleve-controleur

Trscr.	no. de msg	Contenu du message									
1a	10	air	canada	nine	five	one	maintain one		two	thousand	stilpond
							altimetertwo		niner	niner	two
	55	air	france	zero	three	one	maintain one		two	thousand	stilpond
							altimetertwo		niner	niner	two
	112	canadian	sixty-three				maintain one		two	thousand	stilpond
							altimetertwo		niner	niner	two
2a	4	air	canada	nine	five	one	maintain one		two	thousand	stilpond
							altimetertwo		niner	niner	two
	40	air	france	zero	three	one	maintain one		two	thousand	stilpond
							altimetertwo		niner	niner	two
	92	canadian	six	three			maintain one		two	thousand	stilpond
							altimetertwo		niner	niner	two
			callsign	"maintain"		altitude		altimeter reference	"altimeter"		altimeter reading

SCHEMA: ALE
Messages emis par:Pseudo-pilote.

Trscr.	no. de msg	Contenu du message									
1a	11	canada	nine	five	one	leaving	flight	level	two	four	zero
		new	for	flight	iiiii	leaving	two	four	zero	for	one
		two	thousand	roger	check	altimetertwo		niner	niner	two	
	56	france	zero	three	one	leaving	flight	level	two	six	zero
		for	one	two	thousand	altimetertwo		niner	niner	two	roger
	113	canadian	six	three		leaving	flight	level	two	six	zero
		for	one	two	thousand	stilpond	altimetertwo		niner	niner	two
											roger
2a	5	air	canada	nine	five	one	leaving	flight	level	two	four
		zero	for	one	two	thousand	altimetertwo		niner	niner	two
	41	france	zero	three	one	leaving	flight	level	two	six	zero
		new	for	one	two	thousand	stilpond	altimetertwo		niner	niner
											two
	93	canadian	six	three		leaving	flight	level	two	six	zero
		for	one	two	thousand	altimetertwo		niner	niner	two	
		callsign	"leaving"	altitude	"new"	"for"	altitude	altimeter reference	"altimeter"		altimeter reading

SCHEMA: ALO
Messages emis par:Pseudo-pilote.

Trscr. no. de msg		Contenu du message								
1a	75	midtown	air	france	zero	three	one	level	one	two	thousand
	77	town	lufthansafour		seven	one	level	one	two	thousand	
	79	town	lufthansafour		seven	one	level	one	two	thousand	
		-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
		center		callsign			altitude				

SCHEMA: POD
Messages emis par:Eleve-controleur

Trscr. no. de msg		Contenu du message								
1a	43	air	canada	nine	five	one			contact	stilpond	terminal
		one	twenty	five	fifteen						
	45	november	nine	zero	zero	papa	bravo		contact	stilpond	terminal
		on	one	two	five	decimal	one	five			
	92	air	iiiii	air	france	zero	three	one	contact	stilpond	terminal
		one	two	five	decimal	one	five				
	94	duluth	four	seventy-one					contact	stilpond	terminal
		lufthansa	four	seventy-ocontact		stilpond	terminal	one	two	five	decimal
									one	five	
2a	17	air	canada	nine	five	one	iiii		contact	stilpond	terminal
		at	one	two	five	decimal	one	five	now		
	34	november	papa	bravo					contact	sub	stilpond
		terminal	one	two	five	decimal	one	five	now		
	73	air	france	zero	three	one			contact	stilpond	terminal
		one	two	five	decimal	one	five				
	75	lufthansa	four	seven	one				contact	stilpond	terminal
		one	two	five	decimal	one	five	now			
	100	canadian	six	three	contact	stilpond	terminal	one	two	five	decimal
									one	five	now
		-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
			callsign	"contact"		destination			frequency		

SCHEMA: POE
Messages emis par:Pseudo-pilote.

Trscr. no. de msg		Contenu du message									
1a	44		two	five	one	five	air	canada	nine	five	one
											roger
	46		two	five	one	five	november	nine	zero	zero	papa
									bravo	good	day
	93		two	five	one	five	air	france	zero	three	one
											roger
	95	lufthansa	four	seven	one	one	two	five	one	five	
2a	18		two	five	one	five	air	canada	nine	five	one
											roger
	35	one	two	five	one	five	november	nine	zero	zero	papa
											brave
	74		two	five	one	five	air	france	zero	three	one
										good	day
	76		two	five	one	five	lufthansafour		seven	one	
	101		two	five	one	five	canadian	six	three		
		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
			frequency		callsign				"roger"	"good"	"day"

SCHEMA: SIO
Messages emis par:Pseudo-pilote.

Trscr. no. de msg		Contenu du message									
1a	22	town	lufthansafour		seven	one	your	frequency	flight	level	two
										eight	zero
	24	town	center	air	france	zero	three	one	with	you	flight
								level	two	six	zero
	71	midtown	air	canada	eight	five	seven	your	frequency	flight	level
									two	eight	zero
	73	town	canadian	six	three	with	you	level	two	six	zero
2a	16	town	center	lufthansafour		seven	one	your	frequency	flight	level
									two	eight	zero
	20	midtown	air	france	zero	three	one	your	frequency	flight	level
									two	six	zero
	48	midtown	canadian	six	three	your	frequency	flight	level	two	six
											zero
	57	town	center	canada	eight	five	seven	flight	level	two	eight
									zero	your	frequency
	59	midtown	alitalia	six	six	five	with	you	flight	level	three
										one	zero
		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
		center	callsign	"with"	"you"	"your"	"frequency"		"flight"	"level"	altitude

SCHEMA: K
Messages emis par:Eleve-controleur ou pseudo-pilote

Tracr. no. de msg	Contenu du message									
1a 10	november	nine	hundred	papa	bravo	center	roger			
15	november	nine	zero	zero	papa	bravo	roger			
23	*****	four	seventy-one		center	roger				
25	air	france	zero	three	one	center	roger			
55	lufthansa	four	seventy-one		center	roger	...			
72	air	canada	eight	fifty	seven	mooselakeiiiii		air	euh	midtown
									center	roger
74	canadian	six	three	midtown	center	roger				
76	air	france	zero	iiiii	thirty-one		check	your	level	one
									two	thousand
80	lufthansa	four	seven	one	center	roger				
103	alitalia	six	six	five	center	roger	...			
(from a/c) 108	canada	eight	five	seven	roger					
112	air	canada	eight	fifty-seven		center	roger			
2a 4	november	nine	zero	zero	papa	bravo	roger			
6	air	canada	nine	five	one	center	roger			
19	lufthansa	midtown	center	lufthansafour		seven	one	midtown	center	roger
21	air	france	zero	three	one	center	roger			
40	lufthansa	four	seven	one	center	roger				
42	air	france	zero	three	one	center	roger			
56	canadian	six	three	center	roger					
58	air	canada	eight	five	iiiii	seven	center	roger		
60	alitalia	six	six	five	midtown	center	roger			
81	alitalia	six	six	five	roger					
87	alitalia	six	six	five	roger					
89	midtown	to	*****	eight	five	seven	roger			
95	air	canada	eight	five	seven	center	roger			
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
		callsign			center		"roger"		"to"	

SCHEMA: OC
Messages emis par:Eleve-controleur ou pseudo-pilote

Tracr. no. de msg	Contenu du message					
2a 69	air	canada	eight	five	seven	center
	-----	-----	-----	-----	-----	-----
		callsign				center

SCHEMA: GH
Messages emis par:Eleve-controleur ou pseudo-pilote

Tracr. no. de msg	Contenu du message								
2a 70	town	center	air	canada	eight	five	seven	go	ahead
	-----	-----	-----	-----	-----	-----	-----	-----	-----
	center			callsign				"go"	ahead"

SCHEMA: SB
Messages emis par:Eleve-controleur ou pseudo-pilote

Tracr. no. de msg	Contenu du message				
2a 49	canadian	six	three	center	standby
	-----	-----	-----	-----	-----
		callsign			"standby"

Annexe E: Résumé des schémas et des sous-schémas pour les exercices simples

Nom du schema	Source	Description
HDR	Eleve-controleur	Heading Request: l'eleve-controleur demande au pilote quel est son cap.
HDD	Eleve-controleur	Heading Directive: l'eleve-controleur enjoint au pilote de suivre un nouveau cap.
VRD	Eleve-controleur	Vectors to Reintercept Directive: l'eleve-controleur enjoint au pilote de suivre un cap pour intercepter une route aerienne.
VSD	Eleve-controleur	Vectors for Spacing Directive: l'eleve-controleur enjoint au pilote de suivre un nouveau cap.
ALDF	Eleve-controleur	ALtitude Directive and Follow up: l'eleve-controleur enjoint au pilote de changer d'altitude et rapporter lorsqu'il traversera une certaine altitude.
ALD	Eleve-controleur	ALtitude Directive: l'eleve-controleur enjoint au pilote de changer d'altitude.
ALR	Eleve-controleur	ALtitude Request: l'eleve-controleur demande au pilote quelle est son altitude.
POD	Eleve-controleur	Pass On Directive: l'eleve-controleur enjoint au pilote de contacter la prochaine zone de controle (le pilote change alors de juridiction).
K	Eleve-controleur	oK: l'eleve-controleur accuse reception d'un message quelconque.
OC	Eleve-controleur	Open Channel: l'eleve-controleur "ouvre" le canal de communication en appelant une premiere fois, sans mentionner le but de son appel.
SB	Eleve-controleur	Stand By: l'eleve-controleur signale qu'il a recu un message et signale d'attendre son prochain message.
HDA	Pilote	Heading Answer: le pilote fournit son cap.
HDE	Pilote	Heading Directive Echo: le pilote accuse reception du HDD.
VRE	Pilote	Vectors to Reintercept Echo: le pilote accuse reception du VRD.
VSE	Pilote	Vectors for Spacing Echo: le pilote accuse reception du VSD.
ALEF	Pilote	ALtitude Echo and Follow up: le pilote accuse reception du ALDF.
ALF	Pilote	ALtitude Follow up: le pilote signale qu'il a croise l'altitude specifiee.
ALE	Pilote	ALtitude Echo: le pilote accuse reception du ALD.
POE	Pilote	Pass On Echo: le pilote accuse reception du POD.
SIO	Pilote	SItuation report Offer: le pilote signale a l'eleve-controleur qu'il est maintenant dans sa zone.

Nom du schema:	HDR	HDO	VRD	VSD	ALDF
Champ 1: (callsign)	callsign	callsign	callsign	callsign	callsign
Champ 2: (key-words)	"say your heading"		"vectors to re-intercept the airway on course"	"vectors for spacing"	
Champ 3: (position)			position		
Champ 4: (keywords)		"turn"	"turn"	"turn"	
Champ 5: (side)		side	side	side	
Champ 6: (keywords for heading)		"heading"	"heading"	"on a heading of"	
Champ 7: (heading)		heading		heading	
Champ 8: (heading to reintercept)			heading to reintercept		
Champ 9: (keywords for next altitude					"descend to maintain"
Champ 10: (next altitude)					altitude
Champ 11: (keywords for altimeter reference)					"Stilpond altimeter"
Champ 12: (altimeter reading)					alt. reading
Champ 13: (keywords for destination					
Champ 14: (destination)					
Champ 15: (frequency)					
Chap 16: (keywords)			"resume maintain normal navigation on-course"		
Champ 17: (keywords for follow-up action)					"report leaving"
Champ 18: (altitude to be reported)					altitude to be reported

Notes: Les mots entre guillemets representent des elements terminaux (qui ne peuvent etre decomposes) du message. Les mots sans guillemets sont des sous-schemas qui doivent etre instancies.

SOMMAIRE DES SCHEMAS POUR LES EXERCICES SIMPLES (suite)

Nom du schema:	ALO	ALR	POO	K	OC	SB
Champ 1: (callsign)	callsign	callsign	callsign	callsign	callsign	callsign
Champ 2: (key-words)		"say your altitude"		"center roger to"	"center"	"standby"
Champ 3: (position)						
Champ 4: (keywords for turn)						
Champ 5:						
Champ 6: (keywords for heading)						
Champ 7: (heading)						
Champ 8: (heading to reintercept)						
Champ 9: (keywords for next altitude)	"maintain"					
Champ 10: (next altitude)	altitude					
Champ 11: (keywords for altim. reference)	"Stilpond altimeter"					
Champ 12: (altimeter reading)	alt. reading					
Champ 13: (keywords for destination			"contact"			
Champ 14: (destination)			destination			
Champ 15: (frequency)			frequency			
Chap 16: (keywords)			"at"			
Champ 17: (keywords for follow-up action)						
Champ 18: (altitude to be reported)						

Notes: Les mots entre guillemets representent des elements terminaux (qui ne peuvent etre decomposes) du message. Les mots sans guillemets sont des sous-schemas qui doivent etre instancies.

SOMMAIRE DES SOUS-SCHEMAS POUR LES EXERCICES SIMPLES

Nom du schema:	callsign
Champ 1:	"november nine zero zero hundred papa bravo"
Champ 2:	"air canada nine five one"
Champ 3:	"Lufthansa four seven seventy one"
Champ 4:	"Air France zero three one"
Champ 5:	"Alitalia six six sixty five"
Champ 6:	"Air Canada eight five fifty seven"
Champ 7:	"Canadian six sixty three"

Nom du schema:	center
Champ 1:	"midtown"
Champ 2:	"Mooselake"
Champ 3:	"Avalanche"
Champ 4:	"Eastview"
Champ 5:	"tower"
Champ 6:	"Stilpond terminal"

Nom du schema:	altim. ref.
Champ 1:	"Stilpond"

Nom du schema:	side
Champ 1:	"left"
Champ 2:	"right"

Nom du schema:	heading
Champ 1:	"zero one two three"
Champ 2:	"zero one two three four five six seven eight nine niner"
Champ 3:	"zero one two three four five six seven eight nine niner"

Nom du schema:	heading to reintercept
Champ 1:	"zero one two three"
Champ 2:	"zero one two three four five six seven eight nine niner"
Champ 3:	"zero one two three four five six seven eight nine niner"

Nom du schema:	altim. read.
Champ 1:	"two three"
Champ 2:	"zero one nine niner"
Champ 3:	"zero one two three four five six seven eight nine niner"
Champ 4:	"zero one two three four five six seven eight nine niner"

Nom du schema:	next altitude
Champ 1:	in-feet
Champ 2:	in-fl-level

Nom du schema:	in-feet
Champ 1:	"one two three"
Champ 2:	"zero one two three four five six seven eight nine niner"
Champ 3:	"thousand feet"

Nom du schema:	in-fl-level
Champ 1:	"flight level"
Champ 2:	"one two three"
Champ 3:	"zero one two three four five six seven eight nine niner"

Nom du schema:	altitude to be reported
Champ 1:	in-feet
Champ 2:	in-fl-level

Nom du schema:	in-feet
Champ 1:	"one two three"
Champ 2:	"zero one two three four five six seven eight nine niner"
Champ 3:	"thousand feet"

Nom du schema:	in-fl-level
Champ 1:	"flight level"
Champ 2:	"one two three"
Champ 3:	"zero one two three four five six seven eight nine niner"

Annexe F: Attribution des cotes

Elément "callsign": Dans le cas de tous les messages s'adressant à un appareil, l'indicatif d'appel sert à identifier le correspondant. Il n'est pas susceptible de changer (en dépit des formulations alternatives de la part de l'élève-contrôleur). On considère donc que cet élément est figé.

Elément "next sector": Cet élément n'est mentionné jusqu'ici que dans le cas d'un transfert de contrôle d'appareil vers un autre secteur. L'exercice spécifie de quel secteur provient chaque appareil, quel secteur il traversera et vers quel secteur il sera acheminé. On a donc deux sources d'information (le message et le scénario de la simulation) pour connaitre cet élément.

Elément "altitude : next": On ne connait pas à priori quelles altitudes seront utilisées par l'élève-contrôleur. On doit donc utiliser le contenu du message comme source d'information. Une syntaxe locale peut cependant être utilisée.

Elément "heading : next": On ne connait pas à priori quels caps seront utilisés par l'élève-contrôleur. On doit donc utiliser le contenu du message comme source d'information. Une syntaxe locale peut cependant être utilisés.

Elément "position: current": A tout moment, l'élève-contrôleur dispose sur son écran d'un marqueur illustrant la position de l'appareil. Cette position est donc connue par l'ordinateur du simulateur. On a donc deux sources d'information (le message et la position contenue par l'ordinateur du simulateur) pour connaitre la valeur de cet élément.

Elément "altimeter info.": Cet élément fait partie des données de la simulation. On a donc deux sources (le message et le scénario de la simulation) pour connaitre la valeur de cet élément.

Annexe G: Analyse des processus de gestion des erreurs

ANALYSE DES PROCESSUS DE GESTION DES ERREURS

CAS DES DEMANDES DE REPETITION:

Messages emis par l'eleve-controleur:

Transcr.	No. de msg	Formulation					
1a	78	*****		can	you	say	again
3a	32	aircraft	calling	terminal		say	again
4a	188	aircraft	calling	*****	can	you	say	again

Patron: DESTINATAIRE --> CAN YOU SAY AGAIN

Messages emis par le pilote

Transcr.	No. de msg	Formulation									
4a	222	Ascot	five	four	five	two	say	again	altitude		
	241	Canadian clearance	three for	one tango	leaving NDB	one turning	two left	thousand to	for intercept	four say	thousand again	feet heading
	264	Ascot	five	four	five	two	roger	turning	right	sorry	say	again heading

CAS DES AUTOCORRECTIONS A L'INTERIEUR DU MEME MESSAGE

Messages emis par l'eleve-controleur

Transcr.	No. de msg	Formulation									
1a	83	Canadian	six	three	disregardmaintain	heading	three	five	five		
2a	71	Air a	Canada heading	eight of	five three	seven five	vectors five	for correctio	spacing heading	turn zero	right three	on five
3a	7	Canforce	five	four	zero	four	midtown	correctioStilpond		terminal	roger	
3a	21	foxtrot	hotel	sierra	correctiofoxtrot	sierra	hotel	alpha	Stilpond	terminal	...	
3a	35	correctio	terminal	roger								
3a	99	...	turn	right	correctioturn	left	heading	two	zero	zero		
3a	101	november flight	three level	one one	zero eight	echo zero	lima	flight	level	one	correctiomaintain	
3a	132	foxtrot	whiskey	correctiowhiskey	tango	terminal ...						
3a	137	golf altimeter	sierra three	uniform ...	november	stilpond	terminal	roger	Stilpond	terminal	correctioStilpond	
3a	160	golf localizer	sierra back	uniform course	november for	***** ...	...	for	a	localicorrectiostraight-in		
3a	172	foxtrot	x-ray	whiskey	tango	contact	iiiii	correctioEastview		center	one	three
3a	223	...	fifteen	miles	correctioseventeenmiles		from	the	threshold...			

Patron: BLOC SEMANTIQUE --> "CORRECTION" --> BLOC SEMANTIQUE CORRIGE

BLOC SEMANTIQUE INCOMPLET --> "CORRECTION" --> BLOC SEMANTIQUE COMPLET

MOT INCOMPLET --> "CORRECTION" --> BLOC SEMANTIQUE COMPLET

CAS DE L'IDENTIFICATION ET DE LA RESOLUTION D'INCERTITUDES

Transcr.	Suite de msg		Formulation										
1a	3	...	turn	right	heading	zero	three	five					
	4		confirm	right	zero	three	five	for	november	zero	zero	pa	
												br	o
	5		confirm	zero	three	five							
	6		roger										
	35	...	turn	right	heading	zero	three	five	...				
	36	confirm	right	to	zero	three	five	for	Lufthansafour		seven	o	
	47	*****	Lufthansa*****										
	48	I	asked	*****	to	confirm	the	turn	*****				
	49	zero	three	five									
	50	roger											
2a	82	...	turn	left	heading	three	five	five	to	reintercethe		airw	
	83	Air	Canada	eight	five	seven	left	three	five	five	I	don't	
		think	we'll	intercepton		that	heading						
	84	Air	Canada	eight	five	seven	turn	left	heading	three	one	fi	
	85	Canada	eight	five	seven	left	on	three	one	five	to	interce	
												roger	
4a	42	foxtrot	india	oscar	golf	confirm	you-re	through	seven	thousand			
	43	negative	will	call	at	seven	thousand	for	four	thousand	india	os	
		i-m	at	nine	thousand								
	44	india	oscar	golf	roger								
	193	golf	alpha	romeo	oscar	turn	right	heading	two	seven	zero	maintain	
		eight	thousand										
	194	alpha	romeo	oscar	turn	right	heading	two	seven	zero	maintain	***	
		four	thousand	confirm									
	195	negative	maintain	eight	thousand								
	258	Nordair	two	six	two	...							
	259	confirm	that	for	Norontairtwo		six	two	...				
	260	Nordair	two	six	two	roger	...						
		|	|	|	|	|	|	|	|					
	261	Can	you	change	that	in	Norontair						
	262	right	br	whatever	you	say	Nordair						

Patrons: BLOC SEMANTIQUE --> CONFIRM
BLOC SEMANTIQUE --> CONFIRM BLOC SEMANTIQUE
OU
--> (NEGATIVE OU CORRECTION) BLOC SEMANTIQUE

Annexe H: Transcriptions d'exercices complexes

Transcription: IFR, contrôle de terminal, ID= 3a

Notes:

- **Un message émis par l'élève-contrôleur est précédé par C= ou par l'indicatif d'appel Stilpond ou Stilpond Terminal.**
- **Un message émis par le pseudo-pilote est précédé par P=.**
- **Un message émis par un autre centre est prédédé par Other-center ou par le nom du centre.**
- **Un ***** signale un fragment de phrase qui n'a pas pu être identifié.**
- **Un iiiii signale un mot qui a été prononcé de façon incomplète.**

Stilpond= Stilpond Eastview handoff Stilpond zero nine two *****

Stilpond terminal= go ahead this is terminal

Stilpond= eight east of the boundary on the Stilpond zero nine two i-ve got two for you first Canforce five four zero four level eight thousand colocated with Foxtrot India Oscar Golf one zero thousand

Stilpond terminal= Canforce five four zero four and Foxtrot India Oscar Golf identify are identified Victor Mike and could i get control of Foxtrot India Oscar Golf

Eastview= Foxtrot India Oscar Golf your control

P= Stilpond terminal Canforce five four zero four your frequency level eight thousand

Stilpond terminal= Canforce five four zero four midtown correction Stilpond terminal roger

Stilpond terminal= Canforce five four zero four Stilpond altimeter three zero zero zero

P= three zero zero zero Canforce five four zero four roger

P= Stilpond Foxtrot India Oscar Golf with you one zero thousand

Stilpond terminal= Foxtrot India Oscar Golf Stilpond terminal roger cleared to the Tango NDB vectors to the final approach course turn right heading two niner zero

P= ***** cleared Tango NDB right turn two nine zero India Oscar Golf roger

Stilpond terminal= and India Oscar Golf Stilpond altimeter three zero zero zero

P= check three zero zero zero India Oscar Golf roger

Eastview= Stilpond Eastview handoff Stilpond zero nine two *****

Stilpond terminal= go ahead this is Stilpond

Eastview= seven east of the boundary on the Stilpond zero nine two Foxtrot Sierra Hotel Alpha level eight thousand

Stilpond terminal= Foxtrot Sierra Hotel Alpha is identified and we request control

Eastview= Sierra Hotel Alpha your control

P= Stilpond terminal Foxtrot Sierra Hotel Alpha your frequency level eight thousand

Stilpond terminal= Foxtrot Hotel Sierra correction Foxtrot Sierra Hotel Alpha Stilpond terminal roger cleared to the Tango NDB vectors for the final approach course turn right heading two niner zero maintain eight thousand Stilpond altimeter three zero zero zero

P= check three zero zero zero Hotel Alpha cleared to Tango NDB and right turn heading two nine zero maintain present altitude

Stilpond terminal = Foxtrot India Oscar Golf maintain seven thousand

P= Foxtrot Golf leaving one zero thousand for seven roger

Stilpond terminal= Foxtrot Sierra Hotel Alpha maintain seven thousand

P= ***** Hotel Alpha= leaving eight for seven roger

Stilpond terminal= Tower terminal sequence

Tower= tower go ahead

Stilpond terminal= ten miles north east of the airport is Foxtrot India Oscar Golf number one twenty miles east of the airport is Foxtrot Sierra Hotel Alpha number two

Tower= Fox India Oscar Golf and Foxtrot Hotel Alpha roger

P= Stilpond Hotel Alpha level seven thousand

Stilpond terminal= aircraft calling terminal say again

P= terminal Sierra Hotel Alpha level level seven thousand

Stilpond terminal= Sierra Hotel Alpha center roger

Stilpond terminal= correction terminal roger

Stilpond terminal= Foxtrot India Oscar Golf turn right heading two niner five

P= right two nine five Oscar Golf roger

Stilpond terminal= Foxtrot Sierra Hotel Alpha turn right heading two niner five

P= Hotel Alpha in the right turn two nine five roger

Tower= terminal tower

Stilpond terminal= go ahead

Tower= Foxtrot Sierra India Mike is taxiing

Stilpond terminal= Foxtrot Sierra India Mike clearance is valid

Tower= roger

P= terminal India Oscar Golf level seven thousand

Stilpond terminal= India Oscar Golf roger

Stilpond terminal = Foxtrot India Oscar Golf maintain four thousand

P= Oscar Golf leaving seven for four roger

Stilpond terminal = Foxtrot Sierra Hotel Alpha maintain four thousand

P= terminal Hotel Alpha leaving seven for four

Stilpond terminal = Foxtrot India Oscar Golf eight miles north west of Tango twelve miles from touch down turn left heading two zero zero

P= left two zero zero Oscar Golf roger

P= and terminal Oscar Golf level four thousand
Stilpond terminal= Oscar Golf roger

Tower= terminal tower Foxtrot Sierra India Mike off at one five

Stilpond terminal= India Mike off at one five

P= Stilpond Sierra Hotel Alpha level four thousand

Stilpond terminal= Hotel Alpha roger

Tower= and terminal tower

Stilpond terminal= go ahead this is terminal

Tower= i-ve got two more taxiing first November three one zero Echo Lima followed by Foxtrot X-ray Whiskey Tango

Stilpond terminal= November three one zero Echo Lima and Foxtrot X-ray Whiskey Tango ***** check taxiing

P= Stilpond terminal Foxtrot Sierra India Mike your frequency on departure out of four for six

Stilpond terminal= Foxtrot Sierra India Mike Stilpond terminal radar identified maintain one six thousand through five thousand turn right heading two three zero

P= India Mike we-re just passing through five now i-ll climb to one six thousand and right turn heading two three zero

Stilpond terminal= Eastview terminal handoff Stilpond three one one

Eastview= Eastview go ahead

Stilpond terminal= Seven miles from correction seven miles south of the boundary on the three one one radial Canforce five four zero eight level eight thousand victor mike

Eastview= you wanna go ahead on that again i-ve got a Canforce five four zero four

Stilpond terminal= that-s Canforce five four zero four victor mike

Eastview= Canforce five four zero four identified *****

Stilpond terminal= Foxtrot India Oscar Golf cleared to the Stilpond airport for a straight in localizer back course runway one one approach to intercept localizer turn left heading one four zero
P= left one four zero to intercept the localizer cleared to straihgt in the back course one one Oscar Golf roger

Stilpond terminal= Canforce five four zero four contact Eastview center two five two decimal seven now good day

P= five two seven Canforce five four zero four roger

Tower= terminal tower

Stilpond terminal= go ahead this is terminal

Tower= November three one zero Echo Lima ready for departure

Stilpond terminal= November three one zero Echo Lima clearance is valid

Tower= roger

Stilpond terminal= Alpha Sierra India Mike report leaving niner thousand

P= India Mike i-m at nine thousand now

Stilpond terminal= Alpha Sierra India Mike roger

Stilpond terminal= Avalanche terminal handoff Stilpond

Avalanche= Avalanche go ahead

Stilpond terminal= five miles south of Stilpond on a heading of two three zero is Foxtrot Sierra India Mike through niner thousand for one six thousand

Avalanche= Foxtrot Sierra India Mike identified *****

Stilpond center- Foxtrot Sierra India Mike contact midtown center one three two decimal three five now

P- three two three five India Mike

Tower- terminal tower November three one zero Echo Lima off at two two one nine

Stilpond terminal- November three one zero Echo Lima off at two two one nine Victor Mike

P- Stilpond terminal November three one zero Echo Lima on departure ***** ***** six

Stilpond terminal- November three one zero Echo Lima maintain one one thousand through five thousand turn right heading two zero zero

P- November three one zero Echo Lima cleared to one one thousand at five right turn to heading two zero zero roger

Stilpond terminal- and Echo Lima report leaving niner thousand

P- three one zero Echo Lima call you through nine roger

Stilpond thousand- Foxtrot India Oscar Golf contact tower one one niner decimal niner now

P- nineteen nine Oscar Golf

Stilpond terminal- Foxtrot Sierra Hotel Alpha ten miles north west of Tango fifteen miles from touchdown turn right correction turn left heading two zero zero

P- left zero zero Sierra Hotel Alpha roger

Stilpond terminal- November three one zero Echo Lima flight level one correction maintain flight level one eight zero

P- cleared to flight level one eight zero November three one zero Echo Lima roger

Tower- terminal tower

Stilpond terminal- go ahead this is terminal

Tower- Foxtrot X-ray Whiskey Tango ready for departure

Stilpond terminal= Foxtrot X-ray Whiskey Tango clearance is valid

Tower= roger

Tower= Terminal tower Foxtrot X-ray Whiskey Tango off at two two two one

Stilpond terminal= X-ray Whiskey Tango off at two two two one Victor Mike

P= Stilpond terminal euh November three one zero Echo Lima through niner thousand

Stilpond terminal= November three one zero Echo Lima terminal roger

Stilpond terminal= Avalanche terminal handoff Stilpond

Avalanche= Avalanche go ahead

Stilpond terminal= five miles south south east of the Stilpond VORTAC is November three one zero Echo Lima through niner thousand for one for flight level one eight zero Victor Mike

Avalanche= November three one zero Echo Lima identified *****

Stilpond terminal= and he-ll be on a heading of two four zero

Avalanche= roger

Stilpond terminal= November three one zero Echo Lima turn right heading two four zero contact iiiii contact midtown center one three two decimal three five now good day

P= three one zero Echo Lima in the right turn heading two four zero switching one three two three five good day

P= Stilpond terminal Foxtrot X-ray Whiskey Tango your frequency on departure out of four for six

Stilpond terminal= Whiskey Tango terminal radar identified euh maintain seven thousand

P= Whiskey Tango cleared to seven roger out of four thousand five hundred now

Stilpond terminal= Foxtrot Sierra Hotel Alpha turn left heading one four zero

P= left one four zero Hotel Alpha

Stilpond terminal= then Foxtrot Sierra Hotel Alpha cleared to the Stilpond airport for a straight-in localizer back course runway one one approach

P= cleared to straight-in localizer backhorse one one Sierra Hotel Alpha roger

Eastview= Stilpond Eastview handoff Stilpond three one one radial

Stilpond terminal= go ahead this is terminal

Eastview= three euh north west on the boundary on the Stilpond three one one radial Golf Sierra Uniform November level niner thousand

Stilpond terminal= Golf Sierra Uniform November is identified Victor Mike

Stilpond terminal= Foxtrot Whiskey correction Whiskey Tango terminal turn left heading zero three zero to intercept Victor seven

P= left zero three zero to intercept Victor seven Whiskey Tango roger

Stilpond terminal= Foxtrot Sierra Hotel Alpha contact midtown center correction contact Stilpond tower one one niner decimal niner now

P= switching to nineteen nine Sierra Hotel Alpha roger good day

P= Stilpond terminal Golf Sierra Uniform November your frequency level niner thousand

Stilpond terminal= Golf Sierra Uniform November Stilpond terminal roger Stilpond terminal correction Stilpond altimeter three zero zero zero

P= three zero zero zero Uniform November roger

Stilpond terminal= Eastview terminal request control on Golf Sierra Uniform November

Eastview= Golf Sierra Uniform November your control

Stilpond terminal= Golf Sierra Uniform November cleared to the Tango NDB radar vectors to intercept the final approach course turn right heading one four zero

P= to the Tango NDB right turn one four zero Uniform November roger

Stilpond terminal= and Uniform November maintain four thousand

P= Uniform November leaving nine for four roger

P= Stilpond X-ray Whiskey Tango level seven thousand

Stilpond terminal= X-ray Whiskey Tango terminal roger

Eastview= Stilpond Eastview handoff Stilpond zero five six radial

Stilpond terminal= go ahead this is terminal

Eastview= five from the boundary make that four north east of the boundary on the Stilpond zero five six Golf Alpha Romeo Oscar one zero thousand

Stilpond terminal= Golf Alpha Romeo Oscar is identified Victor Mike

Stilpond terminal= Golf Sierra Uniform November twenty miles north west of Tango twenty five miles from touchdown

P= roger

P = Stilpond terminal Golf Alpha Romeo Oscar your frequency one zero thousand

Stilpond terminal= Golf Alpha Romeo Oscar Stilpond terminal roger cleared to the Tango NDB vectors to the final approach course maintain heading maintain altitude Stilpond altimeter three zero zero zero

P= check three zero zero zero Romeo Oscar will maintain altitude

Stilpond terminal = tower terminal sequence

Tower= tower go ahead

Stilpond terminal= fifteen miles north west of the airport is Golf Sierra Uniform November number one twenty five miles north east of the airport is Golf Alpha Romeo Oscar number two

Tower= roger copy

Stilpond terminal= Golf Sierra Uniform November ***** interception of the localizer you-re cleared to the Stilpond airport for a localizer correction straight-in localizer back course for the one one approach

P= cleared in localizer back course one one Uniform November

Stilpond terminal= Uniform November say your altitude

P= Uniform November set at five thousand

Stilpond terminal= Golf Sierra Uniform November contact tower one one niner decimal niner now

P= nineteen nine Uniform November good day

Stilpond terminal= Golf Alpha Romeo Oscar turn right heading two seven zero

P= Alpha Romeo Oscar right turn two seven zero roger

Stilpond terminal= Eastview terminal handoff Stilpond

Eastview= Eastview go ahead

Stilpond terminal= fifteen miles north correction fifteen miles south west of the boundary on the zero five six radial is Foxtrot X-ray Whiskey Tango level seven thousand

Eastview= Foxtrot X-ray Whiskey Tango identified *****

Stilpond terminal= Victor Mike

Stilpond terminal= Foxtrot X-Ray Whiskey Tango contact iiiii correction Eastview center one three three decimal five now good day

P= one three three five Whiskey Tango roger

Stilpond terminal= Romeo Oscar maintain four thousand

P= Alpha Romeo Oscar leaving one zero thousand for four roger

Avalanche= Stilpond Avalanche handoff Stilpond one seven six radial

Stilpond terminal= go ahead this is terminal

Avalanche= ten south of the boundary on the Stilpond one seven six Oscar five four five two level one two thousand

Stilpond terminal= Ascot five four five two is identified and we request control

Avalanche= Ascot five four five two your control

P= Stilpond terminal Ascot five four five two your frequency level one two thousand

Stilpond terminal= Ascot five four five two Stilpond terminal roger cleared to the Tango NDB vectors to the final approach course turn left heading three three zero maintain six thousand

P= Ascot five four five two cleared to Tango NDB and left turn heading three three zero leaving one two thousand for six thousand roger

Stilpond terminal= Golf Alpha Romeo Oscar turn right heading two eight zero
P= right two eight zero Romeo Oscar

Stilpond terminal= Romeo Oscar eight miles north east of the Tango NDB twelve miles from the threshold turn left heading two zero zero

P= left two zero zero Alpha Romeo Oscar roger

Stilpond terminal= Romeo Oscar clear to the Romeo Oscar clear to the Stilpond airport for an straight-in localizer back course one one approach intercept localizer turn left heading one four zero

P= left one four zero to intercept clear to straight-in localizer back course one one Alpha Romeo Oscar roger

Stilpond terminal = and Romeo Oscar say your altitude

P= Romeo Oscar level at four

Avalanche= ***** Stilpond Avalanche ***** got one for you on the Stilpond one seven six

Stilpond terminal= go ahead this is terminal

Avalanche= two south of the boundary on the Stilpond one seven six radial Canadian three one one two thousand

Stilpond terminal= Canadian three one is identified and we request control

Avalanche= Canadian three one your control

P= Stilpond Ascot five four five two level six thousand

Stilpond terminal= Ascot five four five two terminal roger
P= Stilpond terminal Canadian three one your frequency one two thousand

Stilpond terminal= Canadian three one Stilpond terminal roger clear to the Tango NDB vectors to intercept the final approach course turn left heading three two iiiii three two zero maintain seven thousand

P= cleared to Tango iiiii Canadian three one cleared to Tango NDB leaving one two thousand for seven and left turn heading three two zero roger

Stilpond terminal= Golf Alpha Romeo Oscar contact Stilpond tower one one niner decimal niner now good day

P= nineteen nine Alpha Romeo Oscar

Avalanche= Avalanche Eastview handoff Stilpond zero nine two radial

Stilpond terminal= go ahead this is terminal

Eastview= eight east of the boundary on the Stilpond zero nine two Norontair two six two level one zero thousand

Stilpond terminal= Norontair two six two is identified Victor Mike

Stilpond terminal= tower terminal sequence

Tower= tower go ahead

Stilpond terminal= ten south west of the airport is Ascot five four five two number one twenty miles south of the airport is Canadian three one number two

Tower= check Ascot five four five two followed by Canadian three one roger

tower= and terminal tower

Stilpond terminal= go ahead

Tower= I-ve got two taxiing for you first Canforce three two three followed by Golf Romeo Charlie Oscar

Stilpond terminal= Canforce three two three is valid and will ***** call you for Charlie Oscar Victor Mike

Stilpond terminal= Ascot five four five two maintain four thousand

P= Ascot five four five two leaving six for four roger

P= Stilpond terminal Norontair two six two your frequency one zero thousand

Stilpond terminal= Norontair two six two Stilpond terminal roger Stilpond altimeter three zero zero zero

P= check three zero zero zero Norontair two six two roger

Stilpond terminal= and Canadian three one maintain four thousand

P= Canadian three one leaving just leaving seven now for four roger

Stilpond terminal= Ascot five four five four west of the Tango NDB fifteen miles correction seventeen miles from the threshold turn right heading two zero zero

Stilpond terminal= Ascot five four five two correction turn right heading zero two zero

P= Ascot five four five two right to a heading of zero two zero roger and we-ll check our level at four this time

Eastview= Stilpond Eastview handoff Stilpond zero nine two radial

Stilpond terminal= go ahead this is terminal

Eastview= six east of the boundary on the Stilpond zero nine two Foxtrot November Whiskey Foxtrot level eight thousand

Stilpond terminal= Foxtrot November Whiskey Foxtrot is identified Victor Mike

Stilpond terminal= Ascot five four five two cleared to the Stilpond airport for a straight-in localizer back course runway one one approach turn right heading zero eight zero to intercept localizer

P= right turn heading zero eight zero to intercept the localizer cleared to straight-in localizer back course one one Ascot five four five two roger

P= Stilpond terminal Foxtrot November Whiskey Foxtrot your frequency level eight thousand

Stilpond terminal= Foxtrot November Whiskey Foxtrot Stilpond terminal roger Stilpond altimeter three zero zero zero

P= Whiskey Foxtrot check three zero zero zero

Stilpond terminal= and Whiskey Foxtrot cleared to the Tango NDB vectors to the final approach course maintain present heading maintain present altitude

P= Whiskey Foxtrot cleared to Tango NDB present heading and altitude roger

P= Stilpond Canadian three one level four thousand

Stilpond terminal= Canadian three one roger

Stilpond terminal= Eastview terminal request control of Foxtrot November Whiskey Foxtrot
Eastview= November Whiskey Foxtrot your control

Stilpond terminal= Victor Mike

Stilpond terminal= Whiskey Foxtrot turn right heading two niner zero

P= Whiskey Foxtrot turning right heading two nine zero roger

Tower= terminal tower

Stilpond terminal= go ahead

Tower= Canforce three two three is off at two two four five

Stilpond terminal= Canforce three two three off at two two four five Victor Mike

P= Stilpond terminal Canforce three two three your frequency airborne this time instead of two thousand ***** climb to six

Stilpond terminal= Canforce three two three Stilpond terminal radar identified ***** position report through five thousand turn right heading two zero zero

P= Canforce three two three out of five right two zero zero confirm

Stilpond terminal= that-s affirmative right two zero zero maintain niner thousand

P= cleared to nine out of five right two zero zero Canforce three two three roger

**********fin du ruban**********

Transcription: IFR contrôle de terminal, ID= 4a

Notes:

- **Un message émis par l'élève-contrôleur est précédé par C= ou par l'indicatif d'appel Stilpond ou Stilpond Terminal.**
- **Un message émis par le pseudo-pilote est précédé par P=.**
- **Un message émis par un autre centre est prédédé par Other-center ou par le nom du centre.**
- **Un ***** signale un fragment de phrase qui n'a pas pu être identifié.**
- **Un iiiii signale un mot qui a été prononcé de façon incomplète.**

Eastview= Stilpond Eastview handoff on Stilpond zero nine two

Stilpond terminal= Eastview Stilpond terminal go ahead handoff

Eastview= zero nine two degree radial five miles east of the boundary we-ve got Canforce five four zero four level eight thousand colocated Foxtrot India oscar golf level one zero thousand

Stilpond Terminal= ok that-s Canforce five four zero four identified foxtrot india oscar golf radar identified and we request control of both aircraft *****

Eastview= both your control charlie charlie

Stilpond terminal= *****

P= Stilpond terminal .Canforce five four zero four on frequency level eight thousand

Stilpond terminal= Canforce five four zero four Stilpond iiiii Stilpond altimeter three zero zero vectors for spacing turn right heading two nine zero

P= Canforce five four zero four turning right heading two niner zero

P= Stilpond terminal good morning Foxtrot india oscar golf on frequency now level one zero thousand

Stilpond terminal= Foxtrot india oscar golf Stilpond terminal Stilpond altimeter three zero zero zero

P= oscar golf

Stilpond terminal= foxtrot india oscar golf cleared to the tango NDB vectors to the final approach course maintain one zero thousand maintain present heading

P= foxtrot india oscar golf maintain present heading one zero thousand ***** tango

Eastview= Stilpond Eastview handoff zero nine two degrees radial

Stilpond terminal= Eastview Stilpond terminal go ahead

Eastview= ***** zero nine two degree radial seven miles east of the boundary foxtrot oscar hotel alpha eight thousand

Stilpond terminal= foxtrot oscar hotel alpha radar identified *****

Eastview= charlie charlie

Stilpond terminal= foxtrot india oscar golf turn right heading two nine zero

P= foxtrot india oscar golf turning right heading two niner zero

P= ***** check ***** hotel alpha eight thousand

Stilpond terminal= foxtrot sierra hotel alpha Midtown center Stilpond altimeter three zero zero cleared to the tango NDB radar vectors to the final approach course maintain four thousand feet maintain present heading

P= sierra hotel alpha maintain four thousand feet leaving eight thousand now and present heading

Stilpond terminal= foxtrot sierra hotel alpha roger

Stilpond terminal= Canforce five four zero four turn right heading three zero zero

P= Canforce five four zero four turning right heading three zero zero

Stilpond terminal= Eastview Stilpond terminal

Eastview= go ahead

Stilpond terminal= foxtrot sierra hotel alpha three miles inside of boundary request control for vectors

Eastview= your control

Stilpond terminal= foxtrot sierra hotel alpha turn right heading two nine zero

P= sierra hotel alpha right turn two niner zero

Stilpond terminal= tower terminal point out

Tower= go

Stilpond terminal= three miles north east of ***** VDB is foxtrot india oscar golf he-ll be cutting north of your airspace in fifteen euh ten miles in trail of foxtrot sierra hotel alpha

Tower= ***** charlie

Stilpond terminal= foxtrot india oscar golf maintain four thousand

P= india oscar golf maintain four thousand i-m leaving one zero thousand now

P= Stilpond terminal foxtrot sierra hotel alpha level four thousand

Stilpond terminal= foxtrot sierra hotel alpha roger break foxtrot india oscar golf report leaving seven thousand

P= india oscar golf will call through seven thousand for four thousand

Stilpond terminal= foxtrot india oscar golf confirm you-re through seven thousand

P= negative will call at seven thousand for four thousand india oscar golf i-m at nine thousand

Stilpond terminal= india oscar golf roger

Tower= terminal tower

Stilpond terminal= tower terminal go ahead

Tower= foxtrot sierra india mike is taxiing

Stilpond terminal= check sierra india mike taxiing *****

Stilpond terminal= Canforce five four zero four turn left heading two nine zero to intercept Stilpond three one one degree radial upon intercept resume normal navigation

P= Canforce five four zero four turn left two niner zero to pick up the airway

Stilpond terminal= Canforce five four zero four roger

Stilpond terminal= tower terminal

Tower= terminal tower go

Stilpond terminal= foxtrot sierra hotel alpha there now approximately five miles north east of the ***** NDB he-li be cutting now for the ***** north through your airspace

Tower= ***** charlie

P= Stilpond terminal foxtrot India oscar golf is through seven thousand for four thousand

Stilpond terminal= foxtrot india oscar golf roger

Stilpond terminal= foxtrot sierra hotel alpha turn right heading three zero zero

P= sierra hotel alpha turning right heading three zero zero

Stilpond terminal= Tower terminal

Tower= go

Stilpond terminal= restrict sierra hotel restrict sierra india mike to climb to localizer to three thousand

Tower= roger

Tower= and sierra india mike is ready to go

Stilpond terminal= stand-by one

Tower= roger

Stilpond terminal= foxtrot india oscar golf turn left heading two zero zero

P= india oscar golf turning left now left now heading two zero zero

Stilpond terminal= tower terminal

Tower= terminal tower go

Stilpond terminal= Sierra India Mike valid

Tower= Sierra India Mike is rolling two two one five

Stilpond terminal= foxtrot india oscar golf eight miles from the tango NDB twelve miles from the threshold turn left heading two heading one four zero to intercept final approach course upon intercept you-re clear to the airport first straight in back course runway one one approach

P= foxtrot india oscar golf left turn heading one four zero to intercept ***** to the airport straight in localiser back course runway one one approach

Stilpond terminal= foxtrot sierra hotel alpha turn right heading three one zero

P= sierra hotel alpha turning right heading three one zero

P= Stilpond terminal Foxtrot Sierra India mike is on your frequency climbing to three thousand

Stilpond terminal= Foxtrot Sierra India Mike roger maintain one one thousand upon leaving five thousand turn right heading two four zero report leaving nine thousand

P= Foxtrot Sierra india mike climb to one one thousand call through nine thousand ***** and when we-re out of five thousand cleared to the right turn to a heading of two four zero

Stilpond terminal= sierra india mike roger and check you-re radar identified

P= india mike

Tower= terminal tower

Stilpond terminal= go ahead tower

Tower= check november three one zero echo lima is taxiing

Stilpond terminal= taxiing

Tower= and too behind him foxtrot x-ray whiskey tango

Stilpond terminal= and x-ray whiskey tango

Stilpond terminal= and *****

Tower= say again

Stilpond terminal= what what was the out time on s i m

Tower= two two one six

Stilpond terminal= two two one six roger

Stilpond terminal= Foxtrot india oscar golf twelve miles from the tango NDB contact tower one one nine decimal nine now

P= india oscar golf calling tower one one nine decimal nine thanks

Stilpond terminal= foxtrot sierra hotel alpha turn left heading two three zero

P= sierra hotel alpha turning left heading two three zero

Tower= terminal tower

Stilpond terminal= go ahead terminal go ahead tower

Tower= november three one echo lima is *****

Stilpond terminal= *****

Stilpond terminal= foxtrot sierra india mike say your present altitude

P= sierra india mike is through six thousand five hundred for one one thousand

Stilpond terminal= three ***** echo lima is valid tower

Tower= roger

Stilpond terminal= foxtrot sierra hotel alpha amend your heading turn right heading two nine zero

P= sierra hotel alpha turning right heading two niner zero

Stilpond terminal= Eastview Stilpond terminal handoff Stilpond three one one degree radial

Eastview= go

Stilpond terminal= one ***** space on a heading of three zero zero to intercept Stilpond three one one degree radial Canforce five four zero four eight thousand

Eastview= Canforce five four zero four identified
Stilpond terminal= Canforce five four zero four contact Eastview center now one three three decimal five good day

P= ***** one three three decimal five now thanks

P= Stilpond terminal foxtrot sierra india mike is ***** at niner thousand now for one one thousand

Stilpond terminal= foxtrot sierra india mike roger

Stilpond terminal= foxtrot sierra india mike maintain one six thousand

P= ***** one six thousand

Tower= terminal tower

Stilpond terminal= go ahead tower

Tower= three one zero echo lima off two two one nine

Stilpond terminal= Avalanche terminal handoff

Avalanche= go

Stilpond terminal= three miles south south east of Stilpond VOR is foxtrot sierra india mike last report out of nine thousand to climb to one six thousand

Avalanche= foxtrot sierra india mike identified

Stilpond terminal= and he-s heading two four zero

Avalanche= roger

Stilpond terminal= Foxtrot sierra india mike contact Avalanche now one three two decimal three five

P= mike roger one three two three five now thanks

P= Stilpond terminal November three one zero echo lima on your frequency

Stilpond terminal= november three one zero echo lima center

Stilpond terminal= Stilpond iiiii say you-re identified say your present altitude

Stilpond terminal= November three ten ***** say your present altitude

P= november three one zero echo lima is out of five thousand for six thousand

Stilpond terminal= november three one ***** maintain flight level one eight zero turn right heading two iiiii two four zero

P= november three one zero echo lima climb to flight level one eight zero turning right heading two four zero

Tower= terminal tower

Stilpond terminal= foxtrot sierra hotel alpha turn left heading two zero zero

P= sierra hotel alpha turning left heading two zero zero

Stilpond terminal= November three ten echo lima report leaving nine thousand

P= echo lima is just set at niner thousand now

Stilpond terminal= three ten echo lima roger turn left heading two one zero

Stilpond terminal= foxtrot sierra hotel alpha seven miles from the tango NDB eleven miles from the threshold turn left heading two six zero to intercept the localizer upon intercept you-re clear to the airport for a straight in back course runway one one approach

Stilpond terminal= ***** check *****left ***** to a heading one four zero

P= ***** turn left heading one four zero to intercept the on course then we-re clear to the airport for a straight-in localizer back course one one on *****

Tower= terminal tower

Stilpond terminal= go ahead

Tower= foxtrot x-ray whiskey tango is ready to go

Stilpond terminal= stand by

Stilpond terminal= Avalanche terminal handoff

Avalanche= go

Stilpond terminal= ***** to Stilpond VOR is November three one zero foxtrot echo lima headed to two one zero climbing to one eight thousand flight level one eight zero

Avalanche= November three one zero echo lima identified

Stilpond terminal= November three one zero echo lima contact midtown center now one three two decimal three five

P= ***** echo lima one three two three five

Stilpond terminal= tower terminal x-ray whiskey tango is valid

Tower= roger

Stilpond terminal= foxtrot sierra hotel alpha four miles from tango NDB contact tower now one one nine decimal nine good day

P= sierra hotel alpha one one nine decimal nine

Eastview= Stilpond Eastview handoff on the Stilpond three one one degree radial

Stilpond terminal= Eastview Stilpond terminal go ahead handoff

Eastview= three one one degree radial three miles north west of the boundary golf sierra uniform november niner thousand

Stilpond terminal= golf sierra uniform november radar identified request control for vectors

Eastview= your control charlie charlie

Stilpond terminal= *****

Tower= terminal tower x-ray whiskey tango up two two two four

Stilpond terminal= two two two four *****

P= Stilpond terminal golf sierra uniform november is on your frequency level niner thousand

Stilpond terminal= golf sierra uniform november Stilpond terminal roger Stilpond altimeter three zero zero zero clear to the tango NDB radar vectors to intercept the final approach course maintain nine thousand maintain present heading

P= november roger maintain niner thousand present heading

P= Stilpond terminal x-ray whiskey tango is with you i-m climbing to six thousand

Stilpond terminal= x-ray whiskey tango radar identified maintain seven thousand feet upon leaving five thousand turn left heading zero two zero

P= x-ray whiskey tango climb to seven thousand out of five thousand left turn heading zero two zero

Stilpond terminal= iiiii

Stilpond terminal= golf sierra uniform november maintain four thousand

P= golf sierra uniform november maintain four thousand leaving niner thousand

Eastview= Stilpond Eastview handoff on the Stilpond zero five six degree radial

Stilpond terminal= Eastview Stilpond terminal go ahead your handoff

Eastview= five miles from the boundary golf alpha romeo oscar level one zero thousand

Stilpond terminal= golf alpha romeo oscar radar identified *****

Eastview= charlie charlie

Stilpond terminal= x-ray whiskey tango on your heading to zero two zero intercept Stilpond zero five six degree radial resume normal navigation

P= x-ray whiskey tango roger on our present heading to intercept thanks

P= Stilpond terminal good morning golf alpha romeo oscar on your frequency level one zero thousand

Stilpond terminal= golf alpha romeo oscar iiiii Stilpond terminal roger Stilpond altimeter three zero zero clear to the tango NDB vectors to the final approach course maintain present heading

P= alpha romeo oscar ***** tango present heading present altitude

Stilpond terminal= tower terminal pointout sequence

Tower= go

Stilpond terminal= twenty miles from the terminal iiiii twenty miles north west of the terminal is golf sierra uniform november he-ll be number one for approach twenty five miles north east of the terminal just inside the boundary is golf alpha romeo oscar he-ll be number two for approach *****

Tower= charlie charlie

P= Stilpond terminal foxtrot x-ray whiskey tango level seven thousand now established on the airway

Stilpond terminal= aircraft calling ***** can you say again

P= this is x-ray whiskey tango calling in level seven thousand

Stilpond terminal= x-ray whiskey tango roger

Stilpond terminal= Golf sierra uniform november ten miles west of the tango NDB fourteen miles from the threshold turn right heading one four zero to intercept final approach upon interception of the final approach course clear for straight in back course runway one one approach

P= sierra uniform november right turn heading one four zero to intercept and on the intercept ***** cleared to the airport straight in localizer back course one one

Stilpond terminal= golf alpha romeo oscar turn right heading two seven zero maintain eight thousand

P= alpha romeo oscar turn right heading two seven zero maintain ***** four thousand confirm

Stilpond terminal= negative maintain eight thousand

P= roger maintain eight thousand leaving one zero thousand alpha romeo oscar

P= alpha romeo oscar level eight thousand

Stilpond terminal= alpha romeo oscar roger

Stilpond terminal= sierra uniform november four miles from tango NDB contact tower one one nine decimal nine now good day

P= ***** one one nine decimal nine now thanks

Stilpond terminal= Avalanche Stilpond terminal request control of Ascot five four five two

Avalanche= your control

Avalanche= and i-ve got a handoff for you on him

Stilpond terminal= go ahead

Avalanche= on the Stilpond one seven six degrees radial six miles correction five miles south of the boundary is Ascot five four five two he-s level one two thousand your control

Stilpond terminal= Ascot five four five two roger radar identified

P= Stilpond terminal Ascot five four five two on your frequency now level one two thousand

Stilpond terminal= Ascot five four five two roger Stilpond altimeter three zero zero turn check clear to the tango NDB vectors to the final approach course maintain present altitude turn left heading three two zero

P= Ascot five four five two turning left heading three two zero maintain one two thousand

Stilpond terminal= Eastview Stilpond terminal handoff Stilpond zero five six degree radial

Eastview= go ahead

Stilpond terminal= ten miles from the boundary is x-ray whiskey tango flight level check at seven thousand

Eastview= x-ray whiskey tango identified

Stilpond terminal= *****

Stilpond terminal= foxtrot x-ray iiiii x-ray whiskey tango contact Eastview now one three three decimal five good day

P= x-ray whiskey tango one three three decimal five good day

Stilpond terminal= tower this is terminal pointout sequence

Tower= go

Stilpond terminal= twenty miles of the VOR is Ascot five four five two he-ll be number two and behind golf alpha romeo oscar

Tower= charlie charlie

Stilpond terminal= Ascot five four five two maintain four thousand

P= Ascot five four five two maintain say again altitude

Stilpond terminal= Ascot five four five two four thousand

P= Ascot five four five two roger maintain four thousand leaving one two thousand

Stilpond terminal= golf alpha romeo oscar turn left heading two zero zero

P= alpha romeo oscar left turn heading two zero zero

Avalanche= Stilpond Avalanche handoff on the Stilpond one seven six degrees radial

Stilpond terminal= Avalanche terminal go ahead

Avalanche= Stilpond one seven six six miles from the boundary Canadian three one one two thousand

Stilpond terminal= Canadian three one radar identified *****

Avalanche= roger

P= Stilpond terminal good morning Canadian three one with you level one two thousand

Stilpond terminal= Canadian three one standby golf alpha romeo oscar turn left heading one four zero to intercept the localizer

P= alpha romeo oscar left heading one four zero to intercept the localizer

Stilpond terminal= golf alpha romeo oscar roger seven miles from the tango NDB eleven miles from the threshold upon intercept of the localizer clear to the airport for a straight in back course runway one one approach

P= alpha romeo oscar on the intercept clear to the airport for a straight in back course runway one one thanks

Stilpond terminal= golf alpha romeo alpha ***** to intercept localizer

P= alpha romeo oscar is ***** a little bit we-re just in the left turn to pick it up again

Stilpond terminal= roger

Stilpond terminal= Canadian three one Stilpond altimeter three zero zero zero tango clear to the tango NDB radar vectors to the final approach course maintain four thousand feet turn left heading three one zero

P= Canadian three one leaving one two thousand for four thousand feet clearance for tango NDB turning left to intercept say again heading

Stilpond terminal= three one zero

P= in the turn Canadian three one

Stilpond terminal= golf alpha romeo oscar three miles from tango NDB contact tower now one one nine decimal nine good day

P= oscar

Stilpond terminal= tower terminal point out

Tower= go ahead

Stilpond terminal= Canadian three one twenty miles south of VOR is Canadian three one hell-be number two for approach behind Ascot five four five two

Tower= charlie charlie

Eastview= Stilpond Eastview handoff on the zero nine two degree radial

Stilpond terminal= Eastview Stilpond terminal go ahead your handoff

Eastview= Stilpond zero nine two degree radial two miles east of the boundary Norontair two six two one zero thousand

Stilpond terminal= Nordair two six two radar identified request control for vectors

Eastview= your control charlie charlie

Stilpond terminal= *****

Stilpond terminal= Nordair two six two Stilpond terminal are you on frequency

P= Norontair two six two is on frequency one zero thousand
Stilpond terminal= Nordair two six two Stilpond altimeter three zero zero zero vectors iiiii traffic turn right heading three zero zero

P= Confirm that for Norontair two six two right turn three zero zero

Stilpond terminal= Nordair two six two roger turn right heading three zero zero

P= can you change that in Norontair

Stilpond terminal= right or whatever you say Nordair

Stilpond terminal= Ascot five four five four turn right heading zero two zero

P= Ascot five four five two roger turning right sorry say again heading

Stilpond terminal= zero two zero

P= ok Ascot five four five two turning right zero two zero

Stilpond terminal= *****

Tower= terminal tower

Stilpond terminal= tower terminal go ahead

Tower= Canforce three two three is taxiing and number two behind him golf romeo charlie oscar

Stilpond terminal= ok roger

P= Ascot five four five two up at four thousand

Stilpond terminal= Ascot five four five two roger

Eastview= Stilpond Eastview handoff on the zero nine two degree radial

Stilpond terminal= Stilpond terminal Eastview go ahead

Eastview= Stilpond zero nine two degree radial four miles east of the boundary foxtrot november whiskey foxtrot eight thousand

Stilpond terminal= foxtrot november whiskey foxtrot radar identified request control for vectors

Eastview= your control charlie charlie

P= Stilpond terminal foxtrot november whiskey foxtrot on frequency eight thousand

Stilpond terminal= foxtrot november whiskey foxtrot Stilpond terminal Stilpond altimeter three zero zero zero cleared to the tango NDB vectors to the final approach course maintain eight thousand turn right heading two nine zero

P= foxtrot november whiskey foxtrot turning right heading two niner zero maintain eight thousand

P= Stilpond canadian three one level four thousand

Stilpond terminal= canadian three one roger

Stilpond terminal= Ascot five four five two nine miles from the tango NDB thirteen miles from the threshold turn right heading zero eight zero to intercept final approach course upon interception of the final approach course cleared to the airport for a straight in back course runway one one approach

P= Ascot five four five two right turn zero eight zero to intercept the on course and on intercept we-re cleared to the airport for straight in localizer back course one one

Stilpond terminal= Ascot five four five two roger

Tower= Stilpond Eastview euh correction we-ll try that one again terminal tower

Stilpond terminal= tower terminal go ahead

Tower= Canforce three two three is ready

Stilpond terminal= three two three is valid •••••

Tower= roger

Annexe I: Vocabulaire des élèves-contrôleurs pour les exercices complexes

Vocab. combines des transcr. 3a et 4a

A
AFFIRMATIVE
AGAIN
AIRCRAFT
AIRPORT
ALTIMETER
ALTITUDE
AMEND
AN
AND
APPROACH
ARE
AT
BACK
BREAK
CALLING
CAN
CHECK
CLEAR
CLEARED
CONFIRM
CONTACT
CORRECTION
COURSE
DAY
DECIMAL
DEGREE
EUH
FEET
FINAL
FIRST
FLIGHT
FOR
FREQUENCY
FROM
GOOD
HEADING
IDENTIFIED
INTERCEPT
INTERCEPTION
LEAVING
LEFT
LEVEL
LOCALIZER
MAINTAIN
MILES
NAVIGATION

NDB
NEGATIVE
NORMAL
NOW
OF
OFF
ON
POSITION
PRESENT
RADAR
RADIAL
REPORT
RESUME
RIGHT
ROGER
RUNWAY
SAY
SPACING
STANDBY
STRAIGHT-IN
THAT-S
THE
THEN
THRESHOLD
THROUGH
TO
TOUCHDOWN
TRAFFIC
TURN
UPON
VECTORS
YOU
YOUR
YOU-RE

Total (sans les iiiii et *****) 81

Annexe J: Ebauche de schémas additionnels pour les exercices complexes

ANALYSE DES MESSAGES ET ELABORATION DE SCHEMAS ADDITIONNELS

SCHEMA:ALTIMI

Trans.	Msg no.			Contenu	du	message				
3a	8	canforce	five	four	zero	four				
		stilpond	altimeterthree	zero	zero	zero				
	137	stilpond	altimeterthree	zero	zero	zero				
	219	stilpond	altimeterthree	zero	zero	zero				
	234	stilpond	altimeterthree	zero	zero	zero				
4a	8	...	stilpond	altimeterthree	zero	zero	zero	...		
	11	stilpond	altimeterthree	zero	zero	zero				
		callsign		altim.	ref.	"altimeter"		alt. reading		

SCHEMA:ALTIME

Transcrno.	de message			Contenu	du	message					
3a	9	three	zero	zero	zero	canforce	five	four	zero	four	roger
	139	three	zero	zero	zero	uniform	november	roger			
	220	check	three	zero	zero	zero	norontairtwo		six	two	roger
	235	whiskey	foxtrot	check	three	zero	zero	zero			
		alt. reading	"check"	callsign							

SCHEMA:CFAD

Transcrno.	de message				Contenu	du	message				
3a	11	...	cleared	to	the	tango	NDB	vectors	to	the	final
		approach	course	turn	right	heading	two	niner	zero		
	13	and	india	oscar	golf	stilpond	altimeterthree		zero	zero	zero
	21	...	cleared	to	the	tango	NDB	vectors	to	the	final
		course	turn	right	heading	two	niner	zero	maintain	eight	thousand
		stilpond	altimeterthree		zero	zero	zero				
	141	golf	sierra	uniform	november	cleared	to	the	tango	NDB	vectors
		to	interceptthe		final	approach	course	turn	right	heading	one
		four	zero								
	143	and	uniform	november	maintain	four	thousand				
	154	...	cleared	to	the	tango	NDB	vectors	to	the	final
		approach	course	maintain	heading	maintain	altitude	stilpond	altimeterthree		zero
		zero	zero								
	182	...	cleared	to	the	tango	NDB	vectors	to	the	final
		approach	course	turn	left	heading	three	three	zero	maintain	six
		thousand									
	200	...	clear	to	the	tango	NDB	vectors	to	interceptthe	
		final	approach	course	turn	left	heading	three	two	iiiii	three
		two	zero	maintain	seven	thousand					
	236	and	whiskey	foxtrot	cleared	to	the	tango	NDB	vectors	to
		final	approach	course	maintain	present	heading	maintain	present	altitude	
4a	12	foxtrot	india	oscar	golf	cleared	to	the	tango	NDB	vectors
		to	the	final	approach	course	maintain	one	zero	thousand	maintain
		present	heading								
	22	foxtrot	sierra	hotel	alpha	midtown	center	stilpond	altimeterthree		zero
		zero	zero	cleared	to	the	tango	NDB	radar	vectors	to
		the	final	approach	course	maintain	four	thousand	feet	maintain	present
		heading									
	165	...	stilpond	altimeterthree		zero	zero	zero	clear	to	the
		tango	NDB	radar	vectors	to	interceptthe		final	approach	course
		maintai:	nine	thousand	maintain	present	heading				
	181	stilpond	altimeterthree		zero	zero	zero	clear	to	the	tango
		vectors	to	the	final	approach	course	maintain	present	heading	
	208	...	stilpond	altimeterthree		zero .	zero	zero	check	clear	to
		the	tango	NDB	vectors	to	the	final	approach	course	maintain
		present	altitude	turn	left	heading	three	two	zero		
	240	canadian	three	one	stilpond	altimeterthree		zero	zero	zero	tango
		clear	to	the	tango	NDB	radar	vectors	to	the	final
		final	approach	course	maintain	four	thousand	feet	turn	left	heading
		three	one	zero							
	280	foxtrot	november	whiskey	foxtrot	stilpond	terminal	stilpond	altimeterthree		zero
		zero	zero	cleared	to	the	tango	NDB	vectors	to	the
		final	approach	course	maintain	eight	thousand	turn	right	heading	two
		nine	zero								
		"cleared"	"to"	"the"	beacon	"vectors"	"to"	"intercept"	"the"	"final"	"approach"	"course"	"turn"
		side	"heading"	heading	"maintain"	"present"	altitude	"maintain"	"present"	heading	altim.	ref.	
		altimeter	ref.	"altimeter"	altim.	reading							

SCHEMA:CFRE

Transcrno.	de		Contenu	du	message					
message										
3a	12	*****	cleared	tango	NDB	right	turn	two	nine	zero	india
		oscar	golf	roger							
	14	check	three	zero	zero	zero	india	oscar	golf	roger	
	22	check	three	zero	zero	zero	hotel	alpha	cleared	to	tango
		NDB	right	turn	heading	two	nine	zero	maintain	present	altitude
	142	to	the	tango	NDB	right	turn	one	four	zero	uniform
		november	roger								
	144	uniform	november	leaving	nine	for	four	roger			
	155	check	three	zero	zero	zero	romeo	oscar	will	maintain	altitude
	183	ascot	five	four	five	two	cleared	to	tango	NDB	and
		left	turn	heading	three	three	zero	leaving	one	two	thousand
		for	six	thousand	roger						
	201	cleared	to	tango	iiiii	cleared	to	tango	NDB	leaving	one
		two	thousand	for	seven	and	left	turn	heading	three	two
		zero	roger								
	237	whiskey	foxtrot	cleared	to	tango	NDB	present	heading	and	altitude
		roger									
4a	13	foxtrot	india	oscar	golf	maintain	present	heading	one	zero	thousand
		*****	tango								
	23	sierra	hotel	alpha	maintain	four	thousand	feet	leaving	eight	thousand
		now	and	present	heading						
	166	november	roger	maintain	niner	thousand	present	heading			
	182	alpha	romeo	oscar	*****	tango	present	heading	present	altitude	
	209	ascot	five	four	five	two	turning	left	heading	three	two
		zero	maintain	one	two	thousand					
	241	canadian	three	one	leaving	one	two	thousand	for	four	thousand
		feet	clearance	for	tango	NDB	turning	left	to	intercept	say
		again	heading								
	281	foxtrot	november	whiskey	foxtrot	turning	right	heading	two	niner	zero
		maintain	eight	thousand							
		-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

"cleared" beacon side "turn" callsign "to" "maintain" "present" heading altitude

SCHEMA:CARD

Transcrno.	de		Contenu	du	message					
message										
3a	72	foxtrot	india	oscar	golf	cleared	to	the	stilpond	airport	for
		a	straight-in		localizer	back-course		runway	one	one	approach
		to	intercept	localizer	turn	left	heading	one	four	zero	
	125	-then	foxtrot	sierra	hotel	alpha	cleared	to	the	stilpond	airport
		for	a	straight-in		localizer	back-course		runway	one	one
		approach									
	(160	golf	sierra	uniform	november	*****	interception		of	the	localizer
		you-re	cleared	to	the	stilpond	airport	for	a	localizer	correctio
		straight-in	localizer	back-course		for	the	one	one	approach	
	188	romeo	oscar	clear	to	the	romeo	oscar	clear	to	the
		stilpond	airport	for	a	straight-in		localizer	back-course		one
		one	approach	intercept	localizer	turn	left	heading	one	four	zero
	231	ascot	five	four	five	two	cleared	to	the	stilpond	airport
		for	a	straight-in		localizer	back-course		runway	one	one
		approach	turn	right	heading	zero	eight	zero	to	intercept	localizer
4a	72	foxtrot	india	oscar	golf	eight	miles	from	the	tango	NDB
		twelve	miles	from	the	threshold	turn	left	heading	two	heading
		one	four	zero	to	intercept	final	approach	course	upon	intercept
		you-re	clear	to	the	airport	first	straight-in		back-course	
		runway	one	one	approach						
	(140	foxtrot	sierra	hotel	alpha	seven	miles	from	the	tango	NDB
		eleven	miles	from	the	threshold	turn	left	heading	two	two
		six	zero	to	intercept	the	localizer	upon	intercept	you-re	clear
		to	the	airport	for	a	straight-in		back-course		runway
		one	one	approach							
	(141	*****	check	*****	left	*****	to	a	heading	one	four
		zero									
	191	golf	sierra	uniform	november	ten	miles	west	of	the	tango
		NDB	fourteen	miles	from	the	threshold	turn	right	heading	one
		four	zero	to	intercept	final	approach	course	upon	interception	
		of	the	final	approach	course	clear	for	straight-in		back-cour
		runway	one	one	approach						
	233	...	golf	alpha	romeo	oscar	turn	left	heading	one	four
		zero	to	intercept	the	localizer					
	235	...	seven	miles	from	the	tango	NDB	eleven	miles	from
		the	threshold	upon	intercept	of	the	localizer	clear	to	the
		airport	for	a	straight-in		back-course		runway	one	one
		approach									
	284	ascot	five	four	five	two	nine	miles	from	the	tango
		NDB	thirteen	miles	from	the	threshold	turn	right	heading	zero
		eight	zero	to	intercept	final	approach	course	upon	interception	
		of	the	final	approach	cleared	to	the	airport	for	a
		straight-in	back-course		runway	one	one	approach			
		-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

callsign position "cleared" "to" "the" airport "airport" "for" "a" "straight-in" "localizer" "back-course" "runway" runway "approach" "to" "intercept" "the" "localizer" "turn" side "heading" heading

SCHEMA:CARE

Transcrno.	de		Contenu	du	message					
message										
3a 73	left	one	four	zero	to	interceptthe		localizercleared	to	
	straight-in	back-course	one	one	oscar	golf	roger			
127	cleared	to	straight-in		localizerback-course		one	one	sierra	
	hotel	alpha	roger							
161	cleared	in	localizerback-course		one	one	uniform	november		
189	left	one	four	zero	to	interceptclear	to	straight-in		
	localizer	back-course	one	one	alpha	romeo	oscar			
232	right	turn	heading	zero	eight	zero	to	interceptthe	localizer	
	cleared	to	straight-in		localizerback-course		one	one	ascot	
	five	four	five	two	roger					
4a 73	foxtrot	india	oscar	golf	left	turn	heading	one	four	zero
	to	intercept*****		to	the	airport	straight-in		localizerback-cour	
	runway	one	one	approach						
142	*****	turn	left	heading	one	four	zero	to	interceptthe	
	on	course	then	we-re	clear	to	the	airport	fo	a
	straight-in	localizerback-courone			one	on	*****			
192	sierra	uniform	november	right	turn	heading	one	four	zero	to
	intercept	and	on	the	intercept*****		cleared	to	the	airport
	straight-in	localizerback-course			one	one				
234	alpha	romeo	oscar	left	heading	one	four	zero	to	intercept
	the	localizer								
236	alpha	romeo	oscar	on	the	interceptclear		to	the	airport
	for	a	straight-in		back-course	runway	pme	one	thanks	
285	ascot	five	four	five	two	sight	turn	zero	eight	zero
	to	interceptthe		on	course	and	on	interceptwe-re		cleared
	to	the	airport	for	straight-in		localizerback-course		one	
	one									

side "turn" "to" "intercept" "localizer" "cleared" "to" "straight-in" "localizer" "back-course" runway callsign

SCHEMA:DEPD

Transcrno.	de		Contenu	du	message					
message										
3a 64	foxtrot	sierra	india	mike	stilpond	terminal	radar	identified		maintain
	one	six	thousand	through	five	thousand	turn	right	heading	two
	three	zero								
81	alpha	sierra	india	mike	report	leaving	niner	thousand		
93	november	three	one	zero	echo	lima	maintain	one	one	thousand
	through	five	thousand	turn	right	heading	two	zero	zero	
95	and	echo	lima	report	leaving	niner	thousand			
121	whiskey	tango	terminal	radar	identified		euh	maintain	seven	thousand
(250	canforce	three	two	three	stilpond	terminal	radar	identified		*****
4a	position	report	through	five	thousand	turn	right	heading	two	zero
	zero									
77	...	maintain	one	one	thousand	upon	leaving	five	thousand	turn
	right	heading	two	four	zero	report	leaving	nine	thousand	
168	x-ray	whiskey	tango	radar	identifiemaintain		seven	thousand	feet	upon
	leaving	five	thousand	turn	left	heading	zero	two	zero	

callsign center "radar" "identified" "maintain" altitude "through" altitude "turn" side "heading" heading

SCHEMA:DEPE

Trans.	no.	de		Contenu	du	message					
message											
3a	63	india	mike	we-re	just	passing	through	five	now	i-ll	climb
		to	one	six	thousand	and	right	turn	heading	two	three
		zero									
	82	india	mike	i-m	at	nine	thousand	now			
	94	november	three	one	zero	echo	lima	cleared	to	one	one
		thousand	at	five	right	turn	to	heading	two	zero	zero
		roger									
	96	three	one	zero	echo	lima	call	you	through	nine	roger
	122	whiskey	tango	cleared	to	seven	roger	out	of	four	thousand
		five	hundred	now							
(25	1	canforce	three	two	three	out	of	five	right	two	zero
		zero	confirm								
(25	3	cleared	to	nine	out	of	five	right	two	zero	zero
		canforce	three	two	three	roger					
4a	78	foxtrot	sierra	india	mike	climb	to	one	one	thousand	call
		through	nine	thousand	*****	and	when	we-re	out	of	five
		thousand	cleared	to	the	right	turn	on	a	heading	of
		two	four	zero							
	169	x-ray	whiskey	tango	climb	to	seven	thousand	out	of	five
		thousand	left	turn	heading	zero	two	zero			

callsign "i-m at" "we-re just passing through" "i-ll climb to" "cleared to" altitude "and" side "turn" "heading" heading

SCHEMA:DPIO

Transcr.

	no.	de		Contenu	du	message					
message											
3a	63	stilpond	terminal	foxtrot	sierra	india	mike	your	frequencyon		departure
		out	of	four	for	six					
	92	stilpond	terminal	november	three	one	zero	echo	lima	on	departure
		*****	*****	six							
	120	stilpond	terminal	foxtrot	x-ray	whiskey	tango	your	frequencyon		departure
		out	of	four	for	six					
4a	167	stilpond	terminal	x-ray	whiskey	tango	is	with	you	i-m	climbing
		to	six	thousand							
		-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

center callsign "your" "frequency" "on" "departure" "out of" current-altitude "for" next-altitude

SCHEMA:POSI

	no.	de		Contenu	du	message					
Transcrmessage											
3a	151	golf	sierra	uniform	november	twenty	miles	north	west	of	tango
		twenty	five	miles	from	touchdown					
		-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

callsign position

SCHEMA:RAD

	no.	de		Contenu	du	message
Transcrmessage						
4a	129	...	you-re	identified...		
		-------	-------	-------	-------	-------

"you-re" "identified"

Annexe K: Analyse de transmissions concaténées

Analyse de transmissions contenant:
. Soit plusieurs messages pour le meme destinataire
. Soit des messages differents pour plusieurs destinataires

Cas de plusieurs messages pour le meme destinataire:

Transcr.	Msg	Description									
3a	11	foxtrot	india	oscar	golf	stilpond	terminal	roger	cleared	to	the
		tango	NDB	vectors	to	the	final	approach	course	turn	...
	21	foxtrot	hotel	sierra	correctio	foxtrot	sierra	hotel	alpha	stilpond	terminal
		roger	cleared	to	the	tango	NDB	vectors	for	the	...
	118	november	three	one	zero	echo	lima	turn	right	heading	two
		four	zero	contact	iiiii	contact	midtown	center	one	three	...
	137	golf	sierra	uniform	november	stilpond	terminal	roger	stilpond	terminal	correction
		stilpond	altimeter	three	zero	zero	zero				
	154	golf	alpha	romeo	oscar	stilpond	terminal	roger	cleared	to	the
		tango	NDB	vectors	to	the	final	approach	course	maintain	...
	182	ascot	five	four	five	two	stilpond	terminal	roger	cleared	to
		the	tango	NDB	vectors	to	the	final	approach	course	...
	200	canadian	three	one	stilpond	terminal	roger	clear	to	the	tango
		NDB	vectors	to	intercept	the	final	approach	course	turn	...
	219	norontair	two	six	two	stilpond	terminal	roger	stilpond	altimeter	three
		zero	zero	zero							
	234	foxtrot	november	whiskey	foxtrot	stilpond	terminal	roger	stilpond	altimeter	three
		zero	zero	zero							
4a	8	canforce	five	four	zero	four	stilpond	iiiii	stilpond	altimeter	three
		zero	zero	vectors	for	spacing	turn	right	heading	nine	zero
	11	foxtrot	india	oscar	golf	stilpond	terminal	stilpond	altimeter	three	zero
		zero	zero								
	79	sierra	india	mike	roger	and	check	you-re	radar	identified	
	129	stilpond	iiiii	say	you-re	identifie	say	your	present	altitude	
	132	november	three	one	*****	maintain	flight	level	one	eight	zero
		turn	right	heading	two	iiiii	two	four	zero		
	165	golf	sierra	uniform	november	stilpond	terminal	roger	stilpond	altimeter	three
		zero	zero	zero	clear	to	the	tango	NDB	radar	...
	193	golf	alpha	romeo	oscar	turn	right	heading	two	seven	zero
		maintain	eight	thousand							
	208	ascot	five	four	five	two	roger	stilpond	altimeter	tjree	zero
		zero	turn	check	clear	to	the	tango	NDB	vectors	...
	280	foxtrot	november	whiskey	foxtrot	stilpond	terminal	stilpond	altimeter	three	zero
		zero	zero	cleared	to	the	tango	NDB	vectors	to	...

Formes observees:

msg K msg 2

msg 1 msg 2

(msg 1)msg 2

Cas des messages differents pour plusieurs destinataires:

Transcr.	Msg	Description									
1a	10	november	nine	hundred	papa	bravo	center	roger	break	Air	Canada
		nine	five	one	maintain	one	two	thousand	Stilpond	altimeter	...
	55	lufthansa	four	seventy	one	center	roger	break	Air	France	zero
		three	one	maintain	one	two	thousand	Stilpond	altimeter	two	...
	83	canadian	six	three	disregard	euh	maintain	heading	three	five	five
		air	canada	eight	five	seven	vectors	for	spacing	turn	...
	103	alitalia	six	six	five	center	roger	break	air	canada	eight
		five	seven	maintain	one	two	thousand	Stilpond	altimeter	two	...
	112	air	canada	eight	fifty	seven	center	roger	break	canadian	sixty
		three	maintain	one	two	thousand	stilpond	altimeter	two	niner	...
2a	4	november	nine	zero	zero	center	roger	break	air	canada	nine
		five	one	maintain	one	two	thousand	Stilpond	altimeter	two	...
	40	lufthansa	four	seven	one	center	roger	break	air	france	zero
		three	one	maintain	one	two	thousand	stilpond	altimeter	two	...
	87	alitalia	six	six	five	center	roger	break	air	canada	eight
		five	seven	maintain	one	two	thousand	Stilpond	altimeter	two	...
4a	40	foxtrot	sierra	hotel	alpha	roger	break	foxtrot	india	oscar	golf
		report	leaving	seven	thousand						
	233	canadian	three	one	standby	golf	alpha	romeo	oscar	turn	left
		heading	one	four	zero	to	intercept	the	localizer		

Formes observees:

callsign 1 msg K "break" callsign 2 msg 2

callsign 1 (msg 1) callsign 2 msg 2

callsign 1 msg sB callsign 2 msg 2

Annexe L: Vocabulaire des pseudo-pilotes

Vocabulaires combines des messages emanant du pilote.

Transcriptions 1A et 2A:

Mots nets: (transcr. 1A)	Mots nets: (transcr. 2A)	Mots nets (combines 1A et 2A)
A	A	A
ALTIMETER	AHEAD	AHEAD
AND	AIRWAY	AIRWAY
ASKED	ALTIMETER	ALTIMETER
AT	AND	AND
CALL	ARE	ARE
CHECK	AT	ASKED
CONFIRM	CALL	AT
DAY	CHECK	CALL
DESCENT	COURSE	CHECK
END	DAY	CONFIRM
EUH	DON-T	COURSE
FLIGHT	EUH	DAY
FOR	FLIGHT	DESCENT
FREQUENCY	FOR	DON-T
GOOD	FREQUENCY	END
I	GO	EUH
IN	GOOD	FLIGHT
INTERCEPT	HEADING	FOR
LEAVING	I	FREQUENCY
LEFT	INTERCEPT	GO
LEVEL	I-M	GOOD
NOW	JUST	HEADING
OF	LEAVING	I
PASSING	LEFT	IN
RADIAL	LEVEL	INTERCEPT
RIGHT	MISSED	I-M
ROGER	NOW	JUST
STEADY	OH	LEAVING
THE	ON	LEFT
THROUGH	PASSING	LEVEL
TO	RIGHT	MISSED
TOWN	ROGER	NOW
TURN	SORRY	OF
WE-RE	STEADY	OH
WILL	THAT	ON
WITH	THE	PASSING
YOU	THINK	RADIAL
YOUR	THROUGH	RIGHT
	TO	ROGER
	TOWN	SORRY
	TURN	STEADY
	WE	THAT
	WE-LL	THE
	WE-RE	THINK
	WILL	THROUGH
	WITH	TO
	YOU	TOWN
	YOUR	TURN
		WE
		WE-LL
		WE-RE
		WILL
		WITH
		YOU
		YOUR
39 mots	49 mots	56 mots

Vocabulaires combines des messages emanant du pilote.

Transcr. 3A et 4A

Mots nets (Transcr. 3a)	Mots nets (Transcr. 4a)	Mots nets (transcr. combinees)
A	A	A
AIRBORNE	AGAIN	AGAIN
ALTITUDE	AIRPORT	AIRBORNE
AND	AIRWAY	AIRPORT
AT	ALTITUDE	AIRWAY
BACK	AND	ALTITUDE
CALL	APPROACH	AND
CHECK	AT	APPROACH
CLEAR	BACK	AT
CLEARED	BIT	BACK
CLIMB	CALL	BIT
CONFIRM	CALLING	CALL
COURSE	CAN	CALLING
DAY	CHANGE	CAN
DEPARTURE	CHECK	CHANGE
EUH	CLEAR	CHECK
FOR	CLEARANCE	CLEAR
FREQUENCY	CLEARED	CLEARANCE
GOOD	CLIMB	CLEARED
HEADING	CLIMBING	CLIMB
IN	CONFIRM	CLIMBING
INSTEAD	COURSE	CONFIRM
INTERCEPT	DAY	COURSE
I-LL	DECIMAL	DAY
I-M	ESTABLISHED	DECIMAL
JUST	FEET	DEPARTURE
LEAVING	FLIGHT	ESTABLISHED
LEFT	FOR	EUH
LEVEL	FREQUENCY	FEET
LOCALIZER	GOOD	FLIGHT
MAINTAIN	HEADING	FOR
NDB	IN	FREQUENCY
NOW	INTERCEPT	GOOD
OF	IS	HEADING
ON	IT	IN
OUR	I-M	INSTEAD
OUT	JUST	INTERCEPT
PASSING	LEAVING	IS
PRESENT	LEFT	IT
RIGHT	LEVEL	I-LL
ROGER	LITTLE	I-M
SET	LOCALIZER	JUST
STRAIGHT-IN	MAINTAIN	LEAVING
SWITCHING	MORNING	LEFT
THE	NDB	LEVEL
THIS	NEGATIVE	LITTLE
THROUGH	NOW	LOCALIZER
TIME	OF	MAINTAIN
TO	OK	MORNING
TURN	ON	NDB
TURNING	OUR	NEGATIVE
WE-LL	OUT	NOW
WE-RE	PICK	OF
WILL	PRESENT	OK
WITH	RIGHT	ON
YOU	ROGER	OUR
YOUR	RUNWAY	OUT
	SAY	PASSING
	SET	PICK
	SORRY	PRESENT

STRAIGHT-IN		RIGHT
THANKS		ROGER
THAT		RUNWAY
THE		SAY
THEN		SET
THIS		SORRY
THROUGH		STRAIGHT-IN
TO		SWITCHING
TURN		THANKS
TURNING		THAT
UP		THE
WE-RE		THEN
WHEN		THIS
WILL		THROUGH
WITH		TIME
YOU		TO
YOUR		TURN
		TURNING
		UP
		WE-LL
		WE-RE
		WHEN
		WILL
		WITH
		YOU
		YOUR
57 mots	77 mots	86 mots